American Aviation

APRIL 10, 1952 $1.00

FOR THE AIRLINES *Convair 340*

of the incomparably dependable Convair 240, America's newest luxury airliner, the Convair 340, with every travel convenience for 44 passengers, is the largest and finest twin-engine transport ever ordered for airline service.

FOR THE MILITARY *Convair T-29*

navigator-bombardier trainer providing instruction and experience for relatively large groups of students, the Convair T-29, U. S. Air Force version of the Convair-Liner, is a significant contribution to America's rapidly expanding air power.

FOR THE FUTURE *Convair-Turboliner*

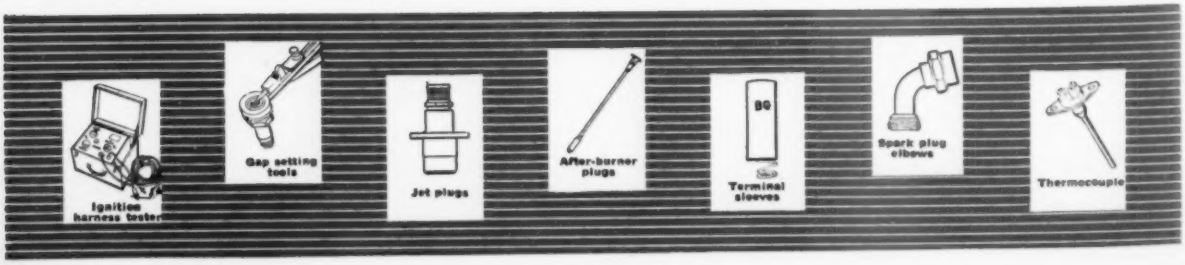
Convair-Liner airframe has demonstrated complete adaptability to the installation of gas-turbine power plants. America's first turboprop transport, the Allison Convair-Turboliner, already has accomplished a series of successful test flights.

IN THE AIR -- IT'S *Convair*

CONSOLIDATED VULTEE AIRCRAFT CORPORATION SAN DIEGO, CALIFORNIA FORT WORTH, TEXAS

AIRLIFT FOR WAR OR PEACE

Gas Turbine Thermocouples by BG
Developed and produced specifically to meet the performance requirements of Gas Turbine engines, BG thermocouples provide the maximum in performance and durability as well as ready accessibility, so important for economical maintenance.
Now in use in aircraft for the military services, these BG Thermocouples are giving exceptional performance under the most rugged operating conditions.
For information on BG products, write:
THE BG CORPORATION
136 WEST 52nd STREET,
NEW YORK 19, N. Y.


Ignition harness tester
Gap setting tools
Jet plugs
After-burner plugs
Terminal sleeves
Spark plug elbows
Thermocouple

American Aviation

THE INDUSTRY'S FIRST NEWS MAGAZINE

NEWS SECTION

Volume 14 Number 39

April 16, 1951

a LOOK at the WEEK

Trend is toward slowing down mobilization program. It doesn't mean a cut in plane order, but it's probable that build-up will be spread over longer period.

•

Air Force's recent New York show to interest subcontractors in aircraft work was so successful that others are planned. At New York show, 25 subcontracts worth $500,000 were signed with manufacturers and 88 more are being negotiated. Future shows will include Chicago, Boston, Detroit, other major cities.

•

Manufacturing employment trend: Out of every 100 workers now being hired by Consolidated Vultee's Ft. Worth Division, 40 are women. Emphasis on hiring women developed within past 90 days.

•

Watch for Air Coordinating Committee to recommend that foreign airlines buying U. S. transport planes receive the same priority treatment as U. S. airlines. Recommendation will go to Defense Production Administration very shortly. Priorities for foreign orders up to last November had been okayed, but no policy had been set for the future.

•

A number of airlines are definitely leaning toward elimination of some discounts and promotional fares. Elimination, however, will depend on what a couple of key airlines decide to do.

•

There's no progress on permanent policy of priority help for lightplane manufacturers. Defense Production Administration hasn't moved on okaying priorities for temporary 90-day period, purpose of which is to gather information on which to base permanent policy. Manufacturers are getting only spot assistance.

•

Del Rentzel, as Undersecretary of Commerce for Transportation, will have under him an office to handle all civil aviation mobilization matters transferred to Commerce by President's executive order. It hasn't been decided who'll head the organization or what it will be called.

•

Railroads will balk at proposed phrase in next fiscal year's military transportation agreements that would place air, rail and bus on equal basis in securing official military business. Rails want continued preferential treatment.

Plane Funds Below Expectations

Indication that the military has slowed down the defense program is seen in the fact that the third 1951 supplemental defense appropriation provides only $1.1 billion more for plane procurement. Earlier reports were that the figure might be $4 billion. Plane funds requested were $700,000,000 for Air Force and $435,000,000 for Navy. Total AF money in third supplemental is $1,925,000,000; Navy, $1,646,000,000.

Prototype Group Changes Jet Specs

Major changes in the specifications for a jet transport have been recommended by the technical subcommittee of the Prototype Aircraft Advisory Committee, and other parts of the prototype testing program have undergone substantial revision. (For other prototype details, see page 35 of this issue).

The subcommittee, charged with responsibility for drawing up specifications for a jet transport which would be eligible for testing under the prototype law, made the following changes which are expected to be adopted by the full committee:

Payload: 20,000 lbs., as against 10,000 lbs. originally recommended.

Range: 2,400 miles plus 800 reserve, compared with original 2,000 plus 800.

Speed: Remains at 500 mph block-to-block.

Radar: Specifications will incorporate provisions for airborne radar, not previously included.

Field Size: 5,600 ft., a reduction from 6,000.

Operating Cost: Remains at 9-13c direct operating cost.

Construction Cost: Two planes for $25,000,000, against original two for $33,000,000.

Other revisions in the testing program include:

Chase C-122: Elimination of Chase C-122 from list of planes to be tested. Subcommittee decided that the plane was not sufficiently different from other current types to provide much useful information.

Turboprop: Specfications for a turboprop are unnecessary at this time, since they will evolve from present aircraft.

Local Service Plane: Increase in allowable minimum field size to 3,300 ft., requirement that plane be able to handle 30 mph cross-wind component, that cargo floor strength be set at 150 lbs. with provisions for 200 lbs per sq. ft., and that plane have direct operating cost, both per ton-mile and per plane mile, less than the DC-3.

Powerplants: Greater emphasis will be placed on powerplant phases of the program, possibly by addition of an engine specialist to the committee.

CAB's Future Plan for Domestic Airlines

A "master plan" for future rearrangement and improvement of the domestic airline system through mergers and dropping of uneconomic services is being prepared by the Civil Aeronautics Board.

This "national planning project," which is not yet in final form, is aimed primarily at preparing the domestic system to withstand hard times. It could involve a substantial re-making of the air map. Here's what is included:

Mergers: A number of mergers and consolidations are

expected to be found desirable by CAB. The Board can't order mergers, so it will act in an "advisory" capacity and hope to bring about such moves through conferences with the airlines. CAB looks to mergers as one way of lowering subsidy requirements.

Routes: It's probable that CAB will order certain route changes, eliminate services which it thinks result in excess competition, and may certificate some new services. These plans deal more with trunks than with local service lines.

Background: Overall planned air map project got underway early last year. CAB Member Josh Lee is in general charge of the work, to which all members and their assistants have contributed. A number of details are being handled by Bernard Slebos, chief of routes division of the Bureau of Air Operations, and his staff.

CAB's Reasons: CAB members don't think the present domestic system is in shape to stand a major depression. Their thinking on the master plan was expressed in the Southern Service to the West case by Chairman Rentzel and Members Ryan and Lee: "It would be short-sighted indeed were we to organize our air transport route pattern on the assumption that conditions in this industry will always be favorable . . . We would be less than helpful if . . . we did not express our considered opinion that further route expansion . . . would present problems of serious difficulty."

Rentzel recently told Congress that until there's a "good route structure, we feel that it would be unsound to go into any wholesale or any major or even any substantial award of additional routes."

CAB's staff is continuing with a number of statistical analyses and until they're completed, the master plan will not be in final form.

UAL Signs $25 Million Gasoline Contract

A three-year contract in excess of $25 million for aviation gasoline has been signed by United Air Lines and Standard Oil Co. of California. Contract, effective Jan. 1, 1952, covers the years 1952-54, taking care of all UAL operations between Salt Lake City and the west coast, length of the Pacific coast and from California to Hawaii. While representing a 75% increase over previous three years, it represents only 46% of the overall company requirements for the period.

MANUFACTURERS

Wright's Sapphire Order: Wright Aeronautical Corp. is reported to have received a production order for 5,000 J-65 Sapphire engines at a cost of about $300,000,000.

RCAF Order for Beech: An order from the Royal Canadian Air Force for an undisclosed number of Beechcraft D18S twin-engined aircraft has been received by Beech Aircraft Corp. First deliveries are scheduled for May. RCAF will use planes as pilot and navigation trainers and in short-range communications work.

Employment Up 100,000: Employment in plane and parts plants increased by 100,000 in first six months after start of Korean war, and is expected to rise another 20% by July 1, according to Labor Department's Bureau of Employment Security. Industry employment at end of January was 362,000.

AiResearch Contract: A contract to supply complete air conditioning and pressurization systems for the first 100 Convair 340's has been awarded to AiResearch Manufacturing Co., Los Angeles. This is third new transport announced in last year to be equipped with AiResearch air conditioning and pressurization systems, other two being Lockheed 1049 and Martin 4-0-4.

Lionel Buys Universal: Universal Aviation Corp., maker of aircraft instrument panels, has been purchased by Lionel Corp. and will operate as a division of Lionel.

No Shutdowns: Suspension of customary vacation shutdown and 1951 inventory closing has been announced by Pratt & Whitney Aircraft Division of United Aircraft.

People: **Willard Landers**, general manager of Fairchild Aircraft Division, has been elected a vice president of Fairchild Engine & Airplane Corp. . . . **Robert B. Kinkead**, formerly with Defense Supply Board of North Atlantic Treaty Organization, has been named director of Republic Aviation Corp.'s European Division . . . **Lee Douglas**, chief engineer Piasecki Helicopter Corp., has been elected to the newly-created position of vice president in charge of engineering . . . **William H. Gunderson**, who has been Bell Aircraft Corp.'s manager of industrial relations, has been named plant manager of company's new Ft. Worth, Tex., facility.

PLANES & EQUIPMENT

New Helicopter Tested: The XA-6 Buck Private, a single-place pulse-jet powered helicopter, has been flight tested by American Helicopter Co., Manhattan Beach, Calif. Company's first pulse-jet helicopter was two-place XA-5 Top Sergeant which was flight tested in early 1949. Company says XA-6, powered by a small American Helicopter conical pulse-jet engine mounted at each of two rotor blade tips, will carry one man for 90 minutes without refueling and has empty weight of about 200 lbs.

Six-Channel GCA: Gilfillan Brothers is building a six-channel automatic GCA unit which Air Force will evaluate at Eglin Field, Fla. The two-channel experimental unit which company has been using for field tests has been sent to Dayton, O., for AF tests.

R-4360 Check: CAA has added Pratt & Whitney R-4360 TSB3-G and B-5 engines using jet power for take-off to the list of engines requiring power checks upon installation in the aircraft after overhaul, at the mid-point in engine service between overhauls and near end of normal overhaul period. Several months ago similar restrictions were placed on certain models of P&W R-2800 engines used in Convair-Liners. R-4360 powers the Boeing Stratocruiser.

MILITARY

ARDC Gets Muroc: Air Force is transferring Edwards AFB, Muroc, Calif., test center, to newly-formed Air Research and Development Command, which is taking over research and development program from Air Materiel Command. ARDC will also take over engineering, flight test, all-weather flying divisions and Office of Air Research, all at Wright-Patterson AFB; Cambridge, Mass., laboratories; electronics labs at Griffis AFB, Rome, N. Y., and guided missile testing at Holloman AFB, N. M. ARDC, which becomes major independent command on May 15 is temporarily located at Wright-Patterson under Maj. Gen. **David M. Schlatter.**

CONGRESS

Stormy Session: Opposition to naming of **D. W. Rentzel** as Undersecretary of Commerce for Transportation and **D. W. Nyrop** as CAB chairman was presented to Senate Interstate and Foreign Commerce Committee in stormy hearings by **Amos Heacock**, president of Aircoach Transport Association. In sharp verbal exchanges, Heacock was characterized as an "ass" by Chairman **Edwin C. Johnson** of the committee for his statement that in two hours he had devised a formula for separating mail pay from subsidy. Heacock said Rentzel and Nyrop had been impartial toward non-skeds while they were CAA Administrators, but he felt differently about them in new positions. He also charged that appointment of **Robert Ramspeck**, former executive vice president of Air Transport Association, as Civil Service Com-

(Continued opposite page 122)

An alert nation moves fast...
Our National Defense Program requires fast air transport of men and materials. Capital Airlines, with a 73-City System covering the heart of industrial America, is fully geared to its important role in this program. Backed by 24 years' experience and continuous growth, Capital now serves over 1/3 of the Nation's population with many new and larger airplanes operating non-stop between principal cities.
Capital
AIRLINES
450 Flights Daily from the Atlantic to the West, the Great Lakes to the Gulf

American Aviation

THE INDUSTRY'S FIRST NEWS MAGAZINE

1025 Vermont Avenue N.W., Washington 5, D. C.
Telephone Sterling 5400
Cable - AMERAV

VOLUME 14 NO. 39 • APRIL 16, 1951

contents

The Pacific Airlift 15
Air Evacuation, Extra Dividend of Airlift 23
Helicopter Proves Value in 1,200 Air Rescues 24
Jet Transport Lacking in Procurement Plan 28
Air Transportable Division—When? 33
Turbine Transport Tests Coming Soon 35
Wanted—A Local Service Airplane 40
Congress: These Men Shape Air Policy 49
Airline Mobilization Plan 52
1950 Best Earning Year for Airlines 55

Operations—Maintenance

Radar—Primary Traffic Control Aid 64
Expanding Transport Designs 72
Lindberg, Griggs Win Industry Awards 74
Top Pilots of 1950 78
On-Time Operations Again Improve 81

Traffic—Sales

30,000,000 Passengers on World Airlines in '50 91
Trans-Atlantic Air Traffic Goes Up 16% 93
Air Freight, Express Make 1950 Gains 94
Coach Revenues Top $43 Million in '50 98
Irregular Traffic Up 67% Over 1949 99
Domestics' Safety Equals Record Year 100

Airports

Large Airports Get 80% of Federal Aid Funds 102
Airports Total 6,403; Major Fields Gain 105
Chicago Again Top Airline Center 107

Local Operations

New Air Taxi Service Begins 108
Lively Market Looms for Executive Planes 111

The 12th edition of 'Air Transport Facts and Figures', compiled by the Air Transport Association of America, is included as a special feature of this issue, beginning opposite page 62.

other publications

American Aviation Daily (including **International Aviation**): Published daily except Saturdays, Sundays and holidays. Subscriptions: $16 one month; $180 one year. Daniel S. Wentz II, managing editor.

American Aviation Directory: Published twice a year, spring and fall. Single copy, $5.00. Marion E. Grambow, managing editor.

Official Airline Guide: Monthly publication of airline schedules and fares. Subscriptions: U. S. A. and countries belonging to the Pan American Postal Union, including Spain and the Philippines, $9.00 one year; Canada, $9.50. All other countries, $11.00. Published from editorial offices at 139 North Clark St., Chicago 2, Ill. State 2-2154. C. N. Johnson, managing editor.

Air Tariff Reports (Cargo and Passenger): Published daily except Saturday, Sunday, and holidays. Rates on request. Preble Staver, managing editor.

Editor and Publisher
WAYNE W. PARRISH

Executive Editor ERIC BRAMLEY
News Director LEONARD EISERER

Editorial Staff

WILLIAM D. PERREAULT ..... *Technical Editor*
JAMES J. HAGGERTY, JR. ..... *Military Editor*
KEITH SAUNDERS ..... *Airports Editor*
GERARD B. DOBBEN ..... *Legislative Editor*
DALLAS R. LONG ..... *Production Editor*
WILLIAM V. HENZEY ..... *Transport Editor*
BARBARA J. WARD ..... *Local Operations*
DANIEL S. WENTZ II ..... *News Analysis*
PREBLE STAVER ..... *Rates & Tariffs*
DORIS ROWZEE ..... *Airline Statistics*

★ ★ ★

FRED S. HUNTER ..... *West Coast Editor*
RICHARD G. WORCESTER ..... *European Editor*
HERBERT SHAW ..... *Air Materiel Command*
PAGE SHAMBURGER ..... *Flying Field Reporter*

Director of Advertising: Stephen R. Kent
Business Manager: John H. Poole
Circulation Promotion: Robert Steinberg

American Aviation is published every Monday by American Aviation Publications, Inc., Washington, D. C. Printed at the Telegraph Press, Harrisburg, Pa. Subscription rates for United States, Canada, Mexico, Central and South American countries—$5.00 for 1 year; $8.00 for 2 years; $10.00 for 3 years. All other countries—$7.00 for 1 year $12.00 for 2 years. Entered as Second-Class matter in Washington, D. C., and Harrisburg, Pa.

Publishing Corporation: American Aviation Publications, Inc., Wayne W. Parrish, president; Albert H. Stackpole, Eric Bramley, vice presidents; E. J. Stackpole, Jr., secretary-treasurer; John H. Poole, assistant secretary-treasurer.

West Coast Office: Park Central Building, 412 West Sixth St., Los Angeles 14, Calif. Trinity 7997. Fred S. Hunter, manager.

Foreign Advertising Representative: United Kingdom—Pearl, Cooper Ltd., 2-3 Norfolk St., Strand, London, W. C. 2. Tel. Temple Bar 8111/2.

American Aviation incorporates Airports and Air Carriers, Airports, Aviation Equipment, The American Pilot, Aviation Sales and Service, U. S. Aviation and American Airports. All rights to these names are reserved.

Only HERTZ can deliver cars to your passengers at the airport in 450 cities!

The Hertz station at the Chicago airport where rental cars are available day and night to incoming air travelers. Other Hertz airport stations are being added as required.

Thus the Hertz-conceived . . . Hertz-built Plane-Auto travel plan promotes air travel

Hertz maintains airport stations in these key cities

Long Beach, Calif.
Palm Springs, Calif.
San Jose, Calif.
Hartford, Conn.
St. Petersburg, Fla. (Pinellas Airport)
Tampa, Fla.
Atlanta, Ga.
Carbondale, Ill.
Chicago, Ill.
Murphysboro, Ill.
Rockford, Ill.
Evansville, Ind.
South Bend, Ind.
Louisville, Ky.
Houlton, Me.
Baltimore, Md.
Bedford, Mass.
Boston, Mass.
Bay City, Mich.
Midland, Mich.
Saginaw, Mich.
St. Louis, Mo.
Whitefish, Mont.
Las Vegas, Nev.
Newark, N. J.
Teterboro, N. J.
Carlsbad, N. M.
Buffalo, N. Y.
New York, N. Y.
Rochester, N. Y.
Syracuse, N. Y.
Durham, N. C.
Greensboro, N. C.
Raleigh, N. C.
Canton, O.
Cincinnati, O.
Cleveland, O.
Dayton, O.
Toledo, O.
Oklahoma City, Okla.
Portland, Ore.
Pittsburgh, Pa.
Scranton, Pa.
Sharon, Pa.
Wilkes-Barre, Pa.
Providence, R. I.
Greenville, S. C.
Memphis, Tenn.
Nashville, Tenn.
Midland, Tex.
Odessa, Tex.
Salt Lake City, Utah
Richmond, Va.
Yakima, Wash.
Madison, Wis.
Milwaukee, Wis.
Toronto, Ont., Canada
Honolulu, T. H.

HERTZ SYSTEM — NOW SERVING YOU IN MORE THAN 450 CITIES

And in *so many other ways*, too, can Hertz serve air line travelers with wholly satisfactory car-rental convenience. Hertz is the only national, and international, car rental system, with service available throughout the United States, Canada, Great Britain, Hawaii and Cuba. Travelers trust, and depend on, Hertz' 25 years' experience. Travelers *know* that when they rent cars from Hertz they will be *properly* insured. Hertz' rates are published rates, and there are no hidden charges. You want the best for your customers in everything, isn't that true? Then your answer . . . in profitable, traffic-building Plane-Auto service . . . is to advertise, promote, and sell the Hertz Plane-Auto Travel Plan!

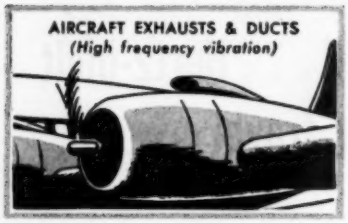
NOTE: Godfrey-Davis, Ltd., largest car rental organization in Europe is *exclusively* a licensee member of the Hertz Driv-Ur-Self System, Inc., and meets reservation passengers with cars at any airport, or hotel, in England, Scotland, Wales and Northern Ireland, or, if desired, anywhere on the Continent.

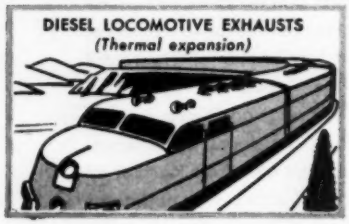
HERTZ *Driv-Ur-Self* **SYSTEM**

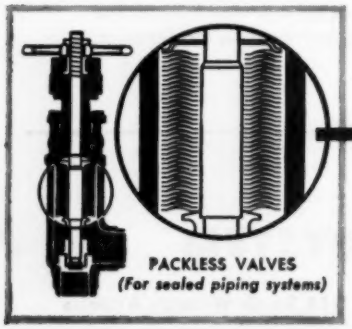
National Headquarters **218 South Wabash Avenue**
Chicago 4, Illinois

BREEZE Job-Engineered BELLOWS

...Give LASTING PROTECTION Where Ordinary Bellows Fail







Breeze welded diaphragm bellows meet the operating life cycle of any equipment in which they are used *because every Breeze bellows design is individually engineered and built for the job.*

Breeze has no "stock bellows," but if you have a vibration problem in ducts, large or small, or want permanently sealed valve enclosures in any type of piping system, or need bellows for torque transmission or other uses, Breeze experience can quickly provide the answer . . . and production can meet your requirements.

A Breeze bellows is dependable because each diaphragm is designed to work well within its elastic limit. This is accomplished by thorough analysis of each application and careful design of the bellows to withstand all requirements. "Job engineering" each individual type eliminates makeshifts, assures efficient performance.

Breeze bellows are made in stainless steel, inconel, monel, nickel, steel, or other weldable alloys.

Feel free to consult us without obligation on your existing bellows requirements, or any other project where reliable welded diaphragm type bellows might solve a design problem.

BREEZE
CORPORATIONS, INC.
41-B South Sixth Street, Newark 17, N. J.

OTHER BREEZE PRODUCTS: ACTUATORS · RADIO SHIELDING · AERO-SEAL HOSE CLAMPS

Aviation Calendar

April 16-18—SAE aeronautic meeting and aircraft engineering display, Hotel Statler, N. Y.

April 19-21—Airport Operators Council annual meeting, Hotel Peabody, Memphis.

April 23-25—American Assoc. of Airport Executives annual meeting, Minneapolis.

April 24-26—Air Transport Assoc. ann. engineering and maintenance conference, Drake Hotel, Chicago.

April 26-27—American Helicopter Society annual forum, Washington, D. C.

May 4—National Handling Exposition, Int'l Amphitheater, Chicago.

May 4-6—Nat'l Intercollegiate Air Meet, Max Westheimer Fld., Norman, Okla.

May 12-13—Airlines Medical Directors Assn. 8th ann. meeting, Hotel Shirley Savoy, Denver.

May 13-14—Airlines Medical Examiners Assn. 4th ann. meeting, Hotel Shirley Savoy, Denver.

May 14-16—Aero Medical Assn. 22nd ann. meeting, Hotel Shirley Savoy, Denver.

May 19-20—Nat'l Pilots air meet and races, Chattanooga Mun. Airport, Tenn.

May 21-24—Society of Aeronautical Weight Engineers tenth annual conference, Hotel Jefferson, St. Louis, Mo.

May 23-24—American Society for Quality Control 5th ann. convention, Hotel Cleveland, Cleveland, Ohio.

May 23-25—Institute of Radio Engineers Technical Conference on airborne electronics, Biltmore Hotel, Dayton, Ohio.

May 24-25—Society of the Plastics Industry annual nat'l meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

May 28-29—Aero. Trng. Society ann. membership meeting, Mayflower Hotel, Washington.

June 3-8—SAE Summer Meeting, French Lick Springs Hotel, French Lick, Ind.

June 13-16—AWA Ann. Convention, Hotel Commodore, New York, N. Y.

June 18-22—American Society for Testing Materials ann. meeting, Atlantic City.

June 27-28—I.A.S. ann. summer meeting, Western Hqs. Bldg., Los Angeles.

June 28-30—Institute of Nav. ann. meeting, Hotel New Yorker, and Kings Point, N. Y.

International

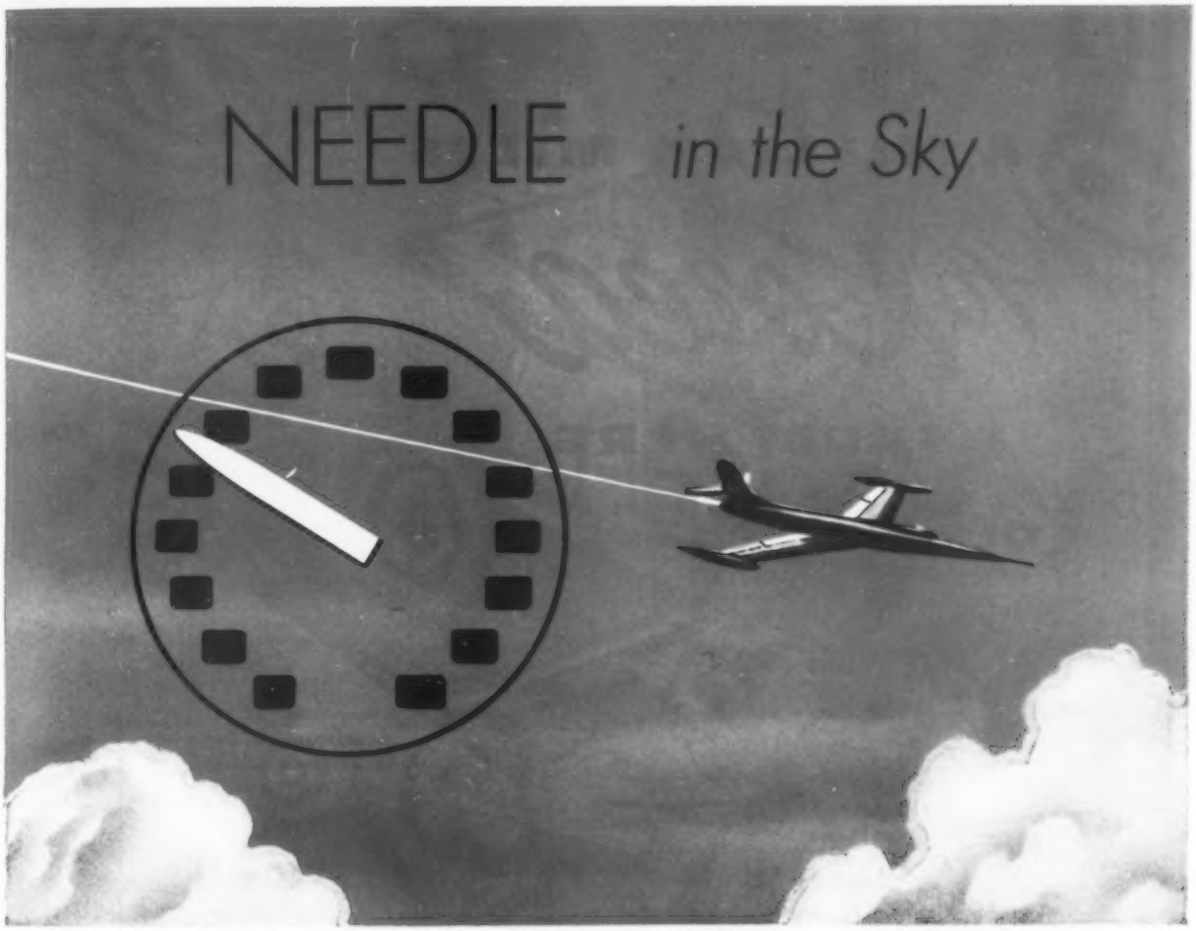
April 24—ICAO Communications Div. meeting, Montreal.

June 5—5th Session, Int'l Civil Aviation Organization, Montreal.

June 15-July 1—Paris Int'l Aircraft Exhibition 1951, Grand Palais and Paris airport.

June 23—British Nat'l Air Races 1951, Hatfield Aerodrome, Hertfordshire, Eng.

June 26—Int'l Civil Aviation Organization, 3rd European Mediterranean regional meeting, location undetermined.



A "needle in the sky," the visible display of a modern fuel measuring system at work, guides the pilots of modern combat aircraft. Absolute reliability, under all conditions, is required.

When Simmonds Aerocessories first came out with electronic fuel gaging, the then-existing methods of fuel measurement became almost obsolete. Simmonds' concept of fuel gaging has since proved itself over billions of air miles on leading commercial and military aircraft.

As a result of its continuous research, Simmonds Aerocessories introduces the PACITRON Electronic Capacitance Type Fuel Gage. This high-precision, low-weight system meets present needs, including compensation for jet fuels, and anticipates certain future requirements.

Conveniently interchangeable units, fewer vacuum tubes than comparable systems and a tank unit adaptable to complex fuel tank geometry, are outstanding features.

The story of PACITRON is told in a 12-page, illustrated bulletin, now available upon request.

SIMMONDS AEROCESSORIES, INC.

Simmonds Products, Inc. — **Tarrytown, N. Y.**

Manufacturing Division: Vergennes, Vermont

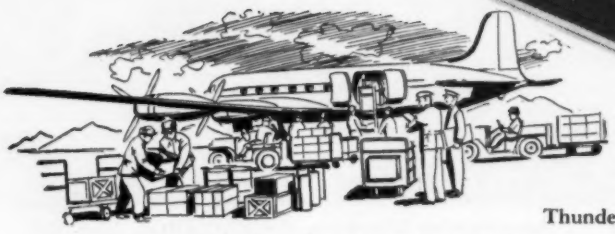
Sales Offices: Glendale, Cal. • Dayton, Ohio • Baltimore, Md. • Montreal, Canada • Seattle, Wash.

More SIMMONDS Products

Push-Pull Controls • Fuel Compensators • Hydraulic Fuses • Hydraulic Remote Actuators • Hydraulic Irreversible Power Actuators • Toggle-Type Cowling Latches • Engine Fuel Metering and Control Equipment • Aircraft Fire Detection Systems • Fuel Flow Distributors • Aircraft Fire Protection and Extinguishing Equipment • Spark Plugs.

A MILLION MILES to Korea ...FROM HERE

CANADAIR PLANTS
AND ADJOINING AIRFIELD,
MONTREAL, CANADA



Thundering across the Pacific Ocean in North Star aircraft . . . built by Canadair for the Royal Canadian Air Force . . . No. 426 Transport Squadron blazed another Canadian record in the skies . . . flying over one million miles in the Korean Airlift in three months . . . carrying over 30% of the total military cargo.

Canadair has one of the best-equipped aircraft plants in the world . . . with forty acres of modern factory facilities, two miles of runways for flight-tests, and a corps of expert designers and engineers drawn from the industry at large. Canadair is equipped to produce every type of military or civil aircraft as well as air frame parts under the most advantageous manufacturing conditions.

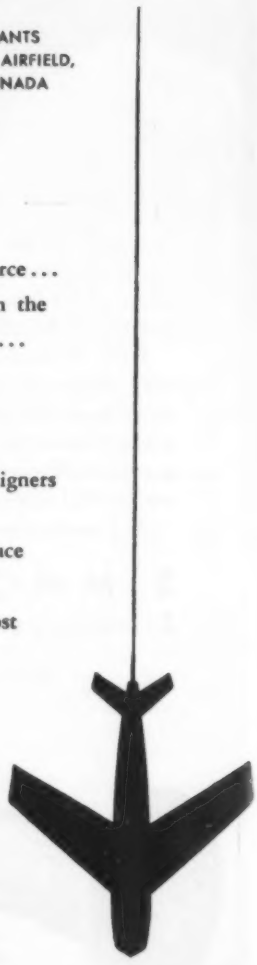
We welcome inquiries.

Vignettes of
CANADA — AIR LAND

Tradition in the air is Canada's right. As far back as 1908 her airmen were establishing her as "air minded" . . . for, in that year, F. W. "Casey" Baldwin became the seventh person in the world to fly a heavier-than-air machine.

Canadian Bush Pilots are world-renowned for their myriad exploits in the great undeveloped areas . . . sagas such as those of W. R. May, "Punch" Dickins and Grant McConachie rank with the world's air pioneers.

Today, prospecting, transportation and communications in the great white wildernesses depend to a great extent on Canadian Bush Pilots . . . Canada's own Air Lift to the Northlands.



Canadair

LIMITED, MONTREAL, CANADA

A Subsidiary of the Electric Boat Company

Groton, Conn. • Bayonne, N.J. • New York, N.Y.

CAS1-ITUS

Right smack in the middle of the aviation picture

● Here, at the busiest intersections of the nation's airways, extends a network of Standard Oil Company (Indiana) airport dealers. They are ready at all times to give you skilled service and quality products.

You owe it to yourself and your plane to plan your flights to include airports that offer reliable *Standard Skyway Service*. The complete dependability of Standard Airport Dealers is known and trusted through and *over* fifteen mid-western states.

Use STANDARD 80/87-octane Aviation Gasoline, made expressly for light craft. This fuel meets the demand for stiff headwind power or gives sure-fire, smooth cruising when you're coasting with a cloud. STANDARD 9/98- and 100/130-octane Aviation Gasolines are available for transport operators. Use these products and all Standard Oil products with confidence.

All private flyers: Ask your Standard Airport Dealer about the added convenience of a Standard Aviation Credit Card—honored from coast to coast. And get your Directory of Midwest Airports offering *Standard Skyway Service*. Let your Standard Airport Dealer take over when you start logging those next Midwest air miles!

STANDARD OIL COMPANY (INDIANA)

STANDARD SKYWAY SERVICE
Everywhere in the Midwest

STANDARD

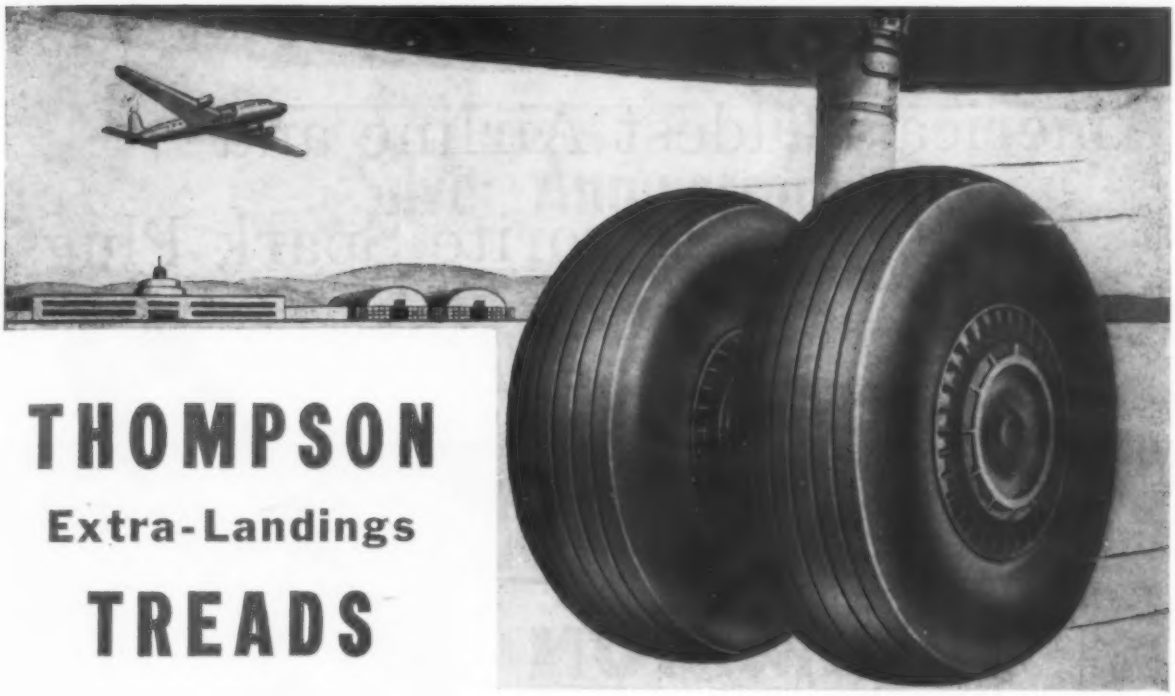
STANDARD Aviation Gasolines
STANDARD Aviation Engine Oils
STANDARD Aviation Lubricants and Hydraulic Oils
QUAKER STATE Aero Engine Oils

The sun never sets on **NORTHWEST AIRLINES**

A WORLD OF EXPERIENCE... OVER 25 YEARS

FINEST COAST TO COAST . . . OVERNIGHT TO HAWAII . . . SHORTEST TO ALASKA AND THE ORIENT

NEW YORK, WASHINGTON, PITTSBURGH, CLEVELAND, DETROIT, CHICAGO, MILWAUKEE, MINNEAPOLIS-ST. PAUL, SEATTLE-TACOMA, SPOKANE, PORTLAND, HONOLULU...CANADA...ALASKA...JAPAN...KOREA...CHINA...FORMOSA...OKINAWA...THE PHILIPPINES



THOMPSON
Extra-Landings
TREADS

Above all, they're safe!

Proved

BY DEPENDABILITY

More airliners land on Thompson Extra-Landings Treads than on all other retreads, recaps, and factory-remolds—airline tire records show *why!*

BY ACCEPTANCE

Airlines value Thompson's greater experience, know-how, and originality—as aircraft tire retreading *specialists.*

BY IMITATION

Some large tire manufacturers are now duplicating Thompson's specially-designed molds for retreading their airplane casings.

THOMPSON *Aircraft Tire* CORPORATION

World's Largest Retreader of Airplane Tires

EASTERN PLANT
International Airport - Miami 48, Florida
Phone 88-1681

WESTERN PLANT
18th & Minnesota Streets - San Francisco 7, California
Mission 7-7320

VETERANS of DEPENDABLE PERFORMANCE—

America's Oldest Airline and America's Favorite Spark Plugs!

Ranking seniority in the air transport field is almost entirely the reward of dependable service through the years. Western Air Lines should feel justly proud, therefore, of its hard-earned position. All major airlines recognize the importance of dependable spark plugs to first-class service and use Champion Spark Plugs in vast majority. W.A.L. has been a Champion user and booster for the twenty-five years of its existence!

More Airlines Use CHAMPIONS than Any Other Make!

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

Silver Anniversary

ANY INDUSTRY can measure its achievements by two criteria. One is the penetration of its acceptance by the public. The other is the extent to which it would be missed if it suddenly ceased to exist.

On this 25th anniversary of scheduled air transportation in the United States, the industry which operates the greatest network of air routes in the world can well afford to pause and reflect on the tremendous achievements it has performed in a brief quarter of a century.

Those who are absorbed by the day-to-day events may forget the struggle for public acceptance of the commercial airplane which dominated the industry's efforts during its first fifteen years of existence. Not until the barrier of resistance could be crossed did the future hold unlimited opportunities. If there is any one achievement above all for which the airlines can be proud during this first 25 years it is the virtual complete acceptance of the airplane as a common means of transportation anywhere in the world.

As for the second measurement of achievement, mere words will not illustrate the impact of air transportation on our individual United States. But this impact can be realized to the fullest if you will pause for a moment and try to visualize this country today without the commercial airplane.

Separate again Los Angeles and New York by four days in terms of travel and mail. Imagine surface transport as the *only* means of connecting Miami and Chicago, or Seattle and Dallas, or Detroit and Atlanta. In your mind throw into low gear the entire industrial, commercial, agricultural and social mechanisms of the country, and then you can begin to appreciate what the commercial airplane has accomplished in a bare quarter of a century to speed up communications and knit the whole country closely together. Even more startling, perhaps, is the fact that most of the essential nature of air transportation has occurred only within the past ten years.

It is perhaps typical of an industry built upon speed that it is giving a somewhat casual recognition to this silver anniversary. An industry constantly expanding and constantly planning has no need for historical reflection.

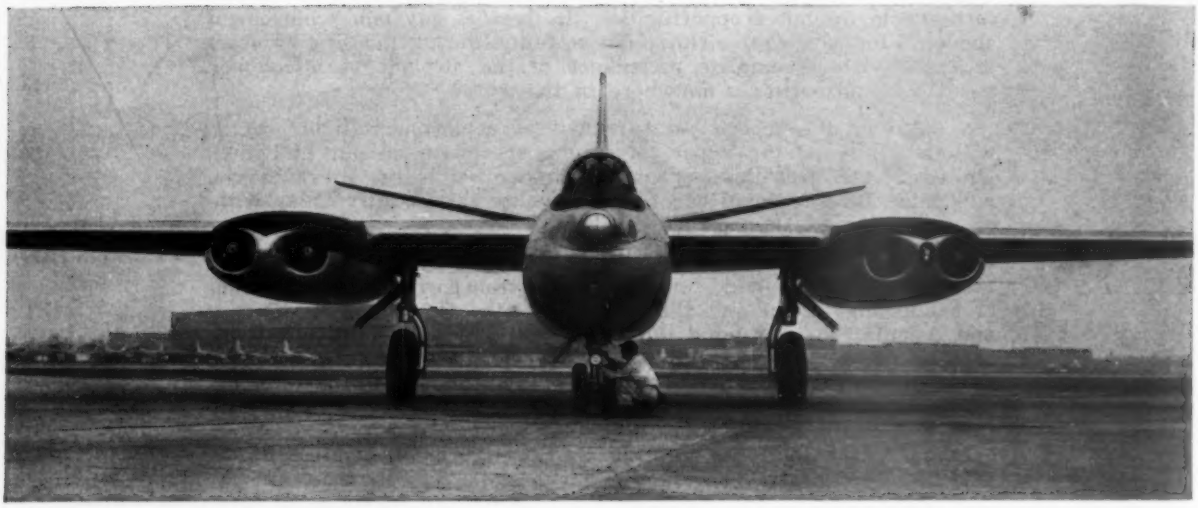
The commercial airplane is still new. It is still pioneering. There is no need to look back when there is an urgency to look forward.

This first quarter century began humbly but with faith and courage when Western Air Express and Varney Air Lines, later to become Western Air Lines and United Air Lines, began scheduled operations in the far west in April, 1926. By any and all standards the next twenty-five years should be as exciting, as fruitful and as significant as the first.

Wayne W. Parrish

EDITOR AND PUBLISHER

B.F.Goodrich



Revolutionary 60,000 lb. wheel proved by year of actual use

THE AIR FORCE needed a new wheel for its fastest bombers—a 56 x 16 wheel with the unheard-of load rating of 60,000 pounds! That's about 15,000 pounds more than the strongest wheel made could carry.

B. F. Goodrich engineers went to work on the problem. They made dozens of design improvements, always with the goal of greater strength *without* major increases in weight.

The wheel they came up with, complete with brakes, weighs less than 1% of the weight of the airplanes. And it not only made the 60,000 lb. rating—it stood up under test loads of 300,000 lbs!

This new B. F. Goodrich wheel—with the greatest load rating of any airplane wheel in current production—has been giving maintenance-free performance now for over a year as standard equipment on Boeing's B-47 (top photo above) and North American's B-45 "Tornado" (bottom photo above). In both cases, the wheels are equipped with the new BFG spider-type brakes and BFG Type VII tires.

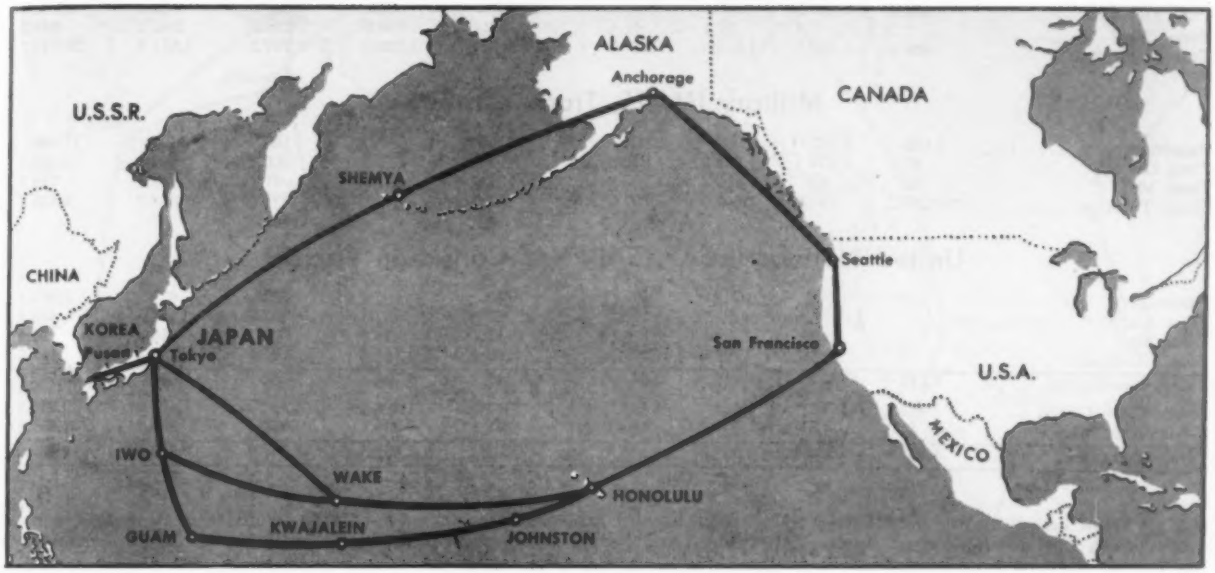
The revolutionary 60,000 pound wheel is another example of how research and engineering make B. F. Goodrich *first* with the answers to aviation's tough problems. *The B.F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F. Goodrich
FIRST IN RUBBER

ESTABLISHED JUNE 1, 1937

American Aviation

VOLUME 14 NUMBER 39



The Pacific Airlift

. . . where air transport emerged as tactical weapon

By JAMES J. HAGGERTY, JR.

THE WAR in Korea, costly though it has been in lives, equipment and money, has been a valuable proving ground for the development of post World War II military techniques.

A number of new weapons and battle formulae received their battle-ground service testing in the Asiatic "police action." But in no case was the degree of postwar development more pronounced than in the field of air transport; for air transport, in the Korean war, emerged from its previous status as a transportation medium alone into a new and more exalted position on the military team —it became a weapon rather than a support service.

By moving thousands of troops and tons of equipment from the American mainland to a war theater thousands of miles away in a matter of days instead of weeks, air transport demonstrated the flexibility of the American military machine and thereby provided a contributing deterrent to future war by giving pause to an aggressive-minded nation and causing it to re-evaluate American military strength in the light of this new-found flexibility.

By flying men and equipment from Japan, not to rear-echelon depots in Korea, but right to the front lines, air transport provided United Nations ground armies with a speed of mobility they would not otherwise have had; air transport, therefore, must be considered a *tactical weapon*, since it contributed as much to the advance of the ground armies as did the tactical air support provided by fighter and bomber aircraft.

In the World War II "Hump" operation and in the post-war Berlin air lift, air transport had shown potentialities of becoming as important a factor in combat operations as strategic bombing and tactical air power. In Korea it achieved that eminence; by its front-line support of ground armies, its drops of paratroops and equipment in critical areas and its aid in evacuating untenable areas with minimum losses, air transport won the enthusiastic support of nearly everyone in Korea, from "GI" rifle-toters to the top ground force commanders of the Army and Marine Corps.

The Pacific airlift might be divided into three separate phases:

(1) the trans-Pacific lift, whereby men and supplies were moved from the continental U. S. to Japan, the base of the war theater;

(2) the combat lift, which moved men and supplies from Japan into Korea;

(3) the fleet logistic lift, whereby Navy aircraft moved a continuous flow of supplies necessary to keep the fleet in action in Korean waters.

Phase One

The Trans-Pacific Lift

When the Korean Reds moved across the 38th parallel into South Korean territory and Gen. MacArthur was ordered to take defensive action

Commercial Airlines Handle Biggest Share of Airlift

U. S. Commercial Airlines

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Totals
Passengers	4,130	6,795	7,020	6,259	2,515	3,533	4,835	4,572	39,659
Tons Cargo	375.3	838.3	785.1	476.8	229.3	585.3	896.7	948.5	5,135.3
Tons Mail	.....	1.4	19.1	41.4	102	196.9	236.3	346.1	943.2
Total Tonnage	839.9	1,566.1	1,615.9	1,270.7	632.4	1,220.6	1,737.2	1,851.5	10,734.3

Military (MATS, Troop Carrier)

Passengers	1,389	6,569	4,067	2,467	2,116	725	188	464	17,985
Tons Cargo	87.5	379.1	558.9	560.6	456.7	623.5	566.7	450.4	3,683.4
Tons Mail	49	85	112.2	125.2	121.6	141.4	41.7	28.3	704.4
Total Tonnage	297.2	1,231.3	1,161.6	987.9	837.6	854.9	631	533.6	6,535.1

United Nations (RCAF, SABENA, Canadian Pacific)

Passengers	128	906	742	847	710	480	629	621	5,063
Tons Cargo	.....	24.3	91	72.8	58.9	87.6	93.9	69.7	498.2
Tons Mail	.....	.....	.....	.....	17.7	14.8	.....	15.3	47.8
Total Tonnage	15	130.2	179.8	177.3	162.4	161.8	171.4	159.3	1,157.2
Total Passengers	**5,647**	**14,270**	**11,829**	**9,573**	**5,341**	**4,738**	**5,652**	**5,657**	**62,707**
Total Tons Cargo	462.8	1,241.7	1,435	1,110.2	744.9	1,296.4	1,557.3	1,468.6	9,316.9
Total Tons Mail	49	86.4	131.3	166.6	241.3	353.1	278	389.7	1,695.4
Total Tonnage	**1,152.1**	**2,927.6**	**2,957.3**	**2 435.9**	**1,632.4**	**2,237.3**	**2,539.6**	**2,544.4**	**18,426.6**

against them last June, the establishment of an aerial supply line from the United States to the war theater became an immediate requirement. MacArthur's Japanese occupation command, a peacetime force, was a small one, not equipped, either in men or weapons, to wage a war of any intensity, even the euphemistically-titled Korean "police action."

The necessary men and supplies could be, and were, dispatched by surface transport. But to bridge the gap between the initiation of action in Korea and the arrival of reinforcements, certain critical categories of troops and equipment were needed immediately if the United Nations were to keep a foothold on the Korean peninsula. To provide these troops and equipment "now" instead of "soon," Military Air Transport Service set up the longest aerial supply line in history, a series of air routes averaging about 7,000 miles.

Prior to the aggressive move of the Korean Reds, MATS had been supplying the Japanese occupation theater with about 70 tons of supplies a month, not so much a supply mission as a routine training mission, keeping open its routes to the Far East and training crews in flying those routes as a precaution against just such an emergency as the one which occurred.

At the start of the Korean campaign MATS immediately diverted 40 Douglas C-54's from its Atlantic and Continental Divisions to the Pacific air lift. At the same time, commercial carriers were contacted and asked to join the lift on a contract basis. The response was immediate—the first chartered civil carrier departed for Tokyo just one week after the Reds moved on Seoul.

MATS and the commercial carriers could not handle the air supply requirements of the war theater alone, however, and more aid was enlisted. The Air Force dug into its troop carrier organization for more lift and sent two groups, the 61st and 62nd Troop Carrier Groups, to join the Pacific lift, adding a welcome 75 C-54's to the transport pool. The Canadian Government sent Squadron 426 of the Royal Canadian Air Force with six DC-4M North Star four-engine transports. Canadian Pacific Air Lines contributed three more DC-4M's and the Belgian Government, through the Belgian airline Sabena, made three DC-4's available.

Meanwhile, United States commercial operators were increasing their contributions, until by late August 66 four-engine charter planes were operating in the Pacific lift.

Three Aerial Bridges

To handle the myriad problems connected with running an intercontinental air lift, MATS in late August created a separate command, the West Coast Air Lift Task Force. To head it, Brig. Gen. Henry C. Kristofferson was recalled to active duty from his position with Pan American World Airways. Headquarters of WCALTF was set up at Travis Air Force Base (formerly Fairfield-Suisun AFB), Calif. Kristofferson was given the dual responsibility of integrating commercial charter aircraft and United Nations planes into the Pacific air lift and controlling traffic and cargo movement to Japan.

Three aerial bridges were thrown across the Pacific from California to Japan, to avoid saturating the facilities on any one route. The shortest route was the Great Circle course, from McChord AFB, Tacoma, Wash., to Anchorage, Alaska, then across the Aleutian chain to Tokyo, using Shemya in the Aleutians as a refueling stop. Total distance on this route was 5,688 miles; average flying time, 33 hours.

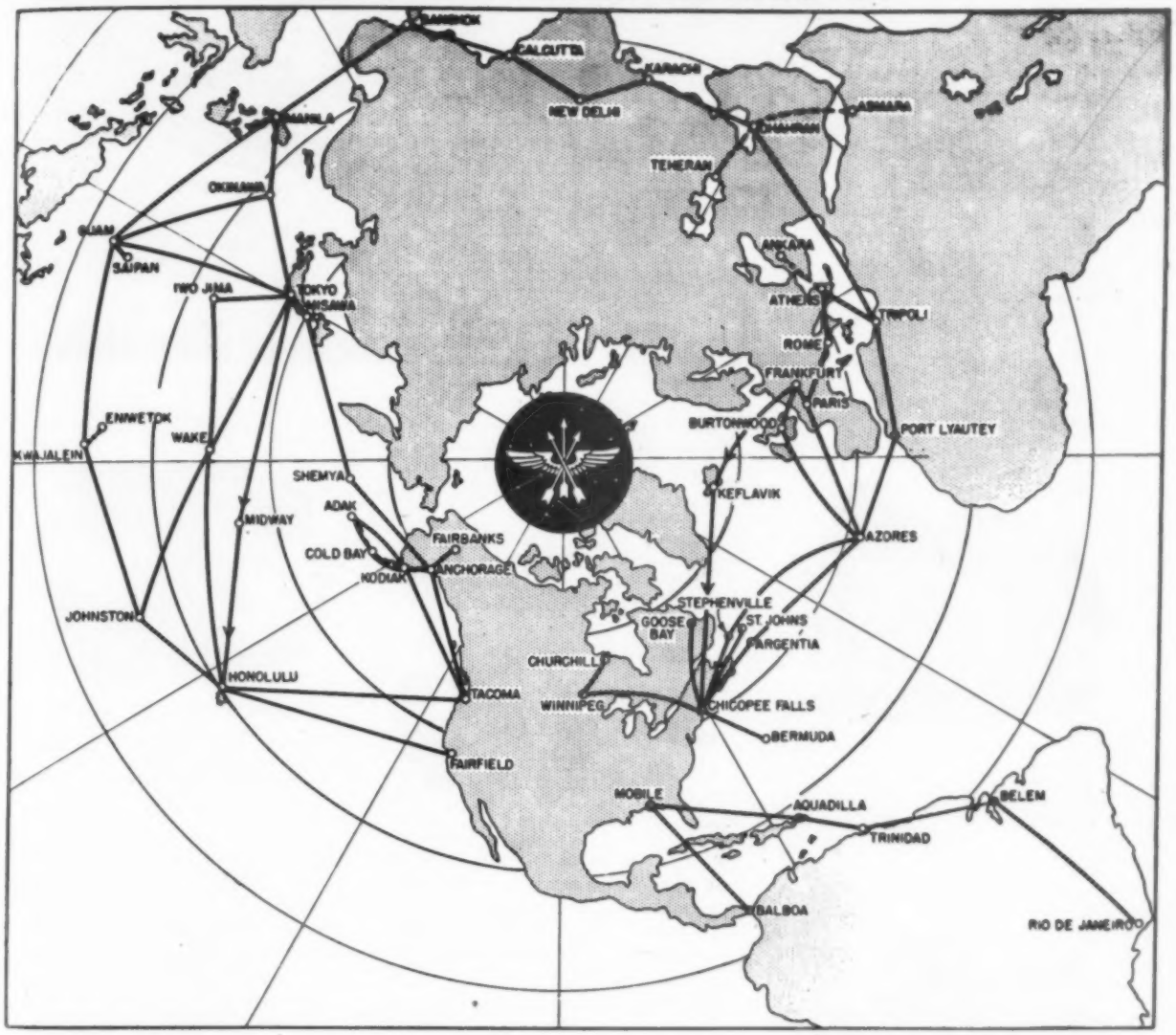
A second route, called the mid-Pacific or "mid-Pac" route, included stops at Honolulu, Johnston Island, Kwajalein and Guam en route to Tokyo. Distance, 8,083 miles, flying time, 45 hours.

The third route entailed but two stops, Honolulu and Wake Island, en route to Tokyo. Distance, 6,772 miles, flying time 38 hours. The eastern terminus of all three routes was Haneda AFB, just outside Tokyo. The average distance over the three routes was close to 7,000 miles; thus, each ton of cargo delivered to Japan represented about 7,000 ton miles. It is the ton-mile figure which makes the achievements of the Pacific air lift doubly impressive.

Tops Berlin Lift

Within the first 90 days of the intercontinental lift the combined efforts of MATS, the troop carrier units, the charter carriers and the United Nations planes had built the outbound tonnage figure up to 106 tons a *day*, about 45 times the pre-Korea tonnage being flown into Japan. The 106 tons a day is not a tremendously impressive figure in itself, by Berlin Air Lift standards, but when it is translated into 742,000 ton-miles or 252,000 plane-miles a day it becomes a staggering figure.

MATS INTERNATIONAL ROUTES



AIR NETWORK of the Military Air Transport Service covers some 75,000 miles spread over four continents, with flights of varying frequency over these routes. MATS operates eight types of transports, the exact number of which is not releaseable except that it is greater than last year's total of about 750. Types in service are: Boeing C-97, Douglas C-74, Douglas C-54 (Navy, R5D), Fairchild C-82, Lockheed C-121, Douglas C-124, Douglas C-118, and Douglas C-47.

In September the Pacific lift topped the best effort of the Berlin lift by 10,000 plane miles a day. And after September the tonnage delivered to Japan via the intercontinental aerial bridge climbed steadily.

The air bridge had two lanes, for the space generated by the outbound cargo was utilized on the way back to evacuate battle casualties and patients from the theater by air. Some charter carriers, with no assigned cargo for the return trip, were released from the lift on a one-trip basis so that they could carry commercial cargoes back to the U. S.

By the end of March of this year, airlift planes had carried to Japan some 23,000 tons or roughly 161,000,000 ton miles. This consisted of an estimated 76,000 passengers (mostly troops), 11,000 tons of cargo and 3,000 tons of mail. On return trips to the U. S. they made 22,000 air evacuations, including 17,000 battle casualties and 5,000 patients. Lift planes crossed the "bridge" well over 4,000 times.

Should any testimonial be required as to the value of the commercial airlines in an emergency, the Pacific airlift certainly supplies it.

Complete figures are not yet available for the month of March, but for nine months through February:

- **Commercial U. S. carriers** had hauled more than 55% of the total outbound (to Japan) tonnage.
- **MATS and troop carrier planes** had lifted a little over 35%.
- **United Nations planes** had carried just under 10%.

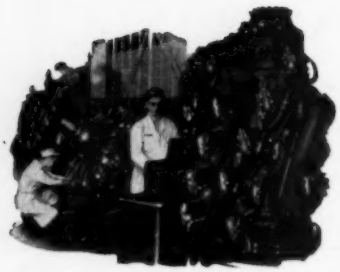
Charter carriers carried over 63% of all the passengers lifted; MATS carried about 28% while the U. N. planes hauled the remainder.

The commercial planes hauled over 55% of the total cargo; MATS lifted just under 40%, the U. N. planes the rest.

Other Jobs for MATS

This record of the airlines, however, should not be construed as an indication that MATS loafed on the job, or that the charter carriers ran a more efficient operation. The

Commercial airliner, Air Force transport or private carrier; safety, efficiency and economy are vital factors.



ENGINE OVERHAUL *is one of PAC's major operations. We pull 'em down and put 'em back quickly and efficiently.*

AIRFRAME OVERHAUL *is another important PAC function. For example, a large number of F-51's and C-54's are in process at two of our six branch locations.*

MANUFACTURING *accounts for an ever increasing portion of total effort. PAC's pressurization systems for high altitude aircraft are standard equipment on many fighter and transport craft.*

PARTS DISTRIBUTION *for major parts manufacturers is handled by PAC throughout the world. Pratt & Whitney, for example, appointed PAC as their first parts distributor.*

THE STRUCTURE of Pacific Airmotive activity is composed of four basic divisions, Engine Overhaul, Airframe Overhaul, Manufacturing and Parts Distribution. Each division is under the supervision of, and operated by, the most highly skilled and experienced men. Twenty-year service is not unusual among PAC craftsmen. The rapid growth the entire PAC organization has shown during the past years proves that its services and facilities are highly regarded by the entire aircraft industry. Quality of PAC engine overhaul has repeatedly extended the time between overhauls... increasing efficiency and profits for many Pacific Airmotive clients.

And, of course, PAC is the first and largest distributor of Pratt & Whitney Engine parts in the world! Also, scores of other leading parts manufacturers are represented by Pacific Airmotive. PAC activity in the airframe overhaul field over a period of many years has resulted in facilities to handle aircraft from the smallest private ship to the large troop carriers. An example is the vast reconversion and modification program on F-51 fighters and C-54 military cargo carriers undertaken for the Air Force. PAC manufactured pressurization equipment is found as an integral part in 90% of all modern fighters and pressurized commercial transport craft.

★

It's great to work and live in sunny California. Engineers, and many categories of skilled aircraft workers are needed by PAC... drop us a line.

★ ENGINE OVERHAUL ★ AIRFRAME OVERHAUL
★ MANUFACTURING ★ PARTS & SUPPLIES

PAC

ESTABLISHED 1936

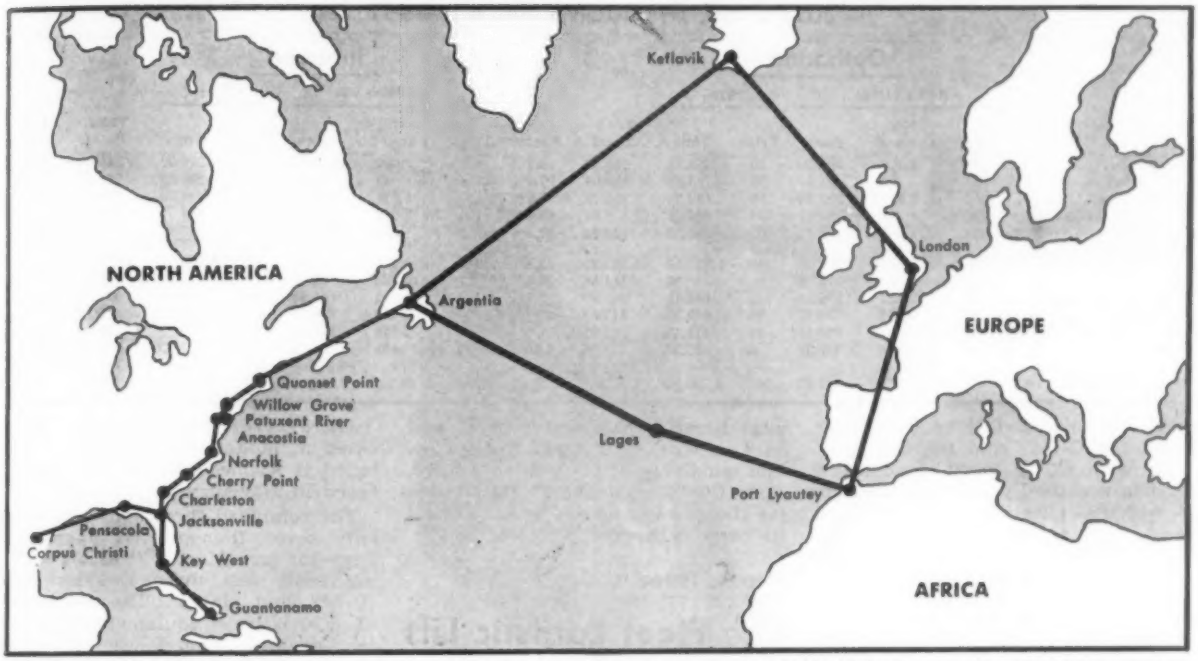
KEEPS 'EM FLYING

PACIFIC AIRMOTIVE CORPORATION

Executive Offices: BURBANK, CALIFORNIA

Other Divisions: Oakland and Chino, Calif. • Seattle, Washington
Kansas City, Kansas • Linden, New Jersey

NAVY'S SCHEDULED ATLANTIC AIR ROUTE



NAVY'S SEPARATE AIR transport organization, Fleet Logistic Air requirements, but FLAW Atlantic runs the scheduled operation Wings, was created to handle specialized needs of fleet support shown above. Both wings use Douglas R4D (C-47) and R5D (C-54) FLAW Pacific has no scheduled routes, operating only under fleet aircraft, plus a number of smaller types.

record was built by MATS design, for MATS, with anything but a bottomless pool of aircraft, had many other commitments to handle, such as the greatly increased lift to the European theater as storm clouds gathered there and the movement of Strategic Air Command's supporting equipment as planes of that command were assigned all over the globe.

Therefore, the decision was made by the military planners to let the charter carriers carry the major portion of the Pacific load, while MATS would concentrate its energies elsewhere.

From the standpoint of outbound tons carried, **Pan American World Airways** leads the U. S. commercial carriers. The latest available data credits Pan Am with carrying about 29% of the total. **Northwest Airlines** was second with 16½%, followed by **Seaboard & Western Airlines** with just over 10% and **United Air Lines** with just under 10%. Again, this is not indicative of greater effort on the part of one carrier. The difference in tonnages was determined by the number of planes the carrier had in the lift, the number of trips assigned it and the configuration of the airplane.

Phase Two

The Combat Lift

In the early days of the Korean war, when the Korean Reds drove the U.N. forces into their narrow beachhead near Pusan, supply presented no great problem. The harbor at Pusan was a good one and sea transports, supplemented by trucks, could handle the supply load. The top level planners figured that, when they broke out of the beachhead and started to move north, they could continue to handle the supply problem by sea transport, since there appeared to be two good harbors available, one at Inchon on the west coast of the Peninsula and one at Pohang on the east coast.

Where MATS Left Off

But when the U.N. forces finally broke out of the beachhead with an amphibious assault on Inchon and started to move up the peninsula, the planners suffered a disappointment—the harbors were not all they had expected.

Since the railroads in Korea were practically non-existent and since it was impossible to keep supplies moving from Pusan by truck over terrible roads, there was only one answer to the Korean supply problem—air transport. Thus the Combat Cargo Command was born.

CCC was organized as a provisional division of the Far East Air Forces, and the USAF's top air transport operations man, Maj. Gen. William H. Tunner, who had commanded the "Hump" and Berlin lift operations, was temporarily detached from MATS to head it.

CCC took over where MATS left off, at Tachikawa AFB, outside of Tokyo. Troops flown into Japan by MATS were processed at nearby Army camps and loaded aboard CCC ships at Tachikawa for delivery to Korea. Cargo from the States, from Okinawa and other points in Japan which was destined for use in Korea was either flown or trucked into Tachikawa.

From Tachikawa, CCC flew its loads first to Ashiya AFB on the northern tip of Kyushu Island, southernmost of the Japanese island chain, just 110 miles across the Sea of Japan from Pusan, Korea. Ashiya was (and still is) the focal point of the entire combat air lift; it was there that the cargo was regrouped and flown directly to Korea.

At the height of the war, Ashiya was the headquarters of CCC. At that time the 314th Troop Carrier Wing, flying Fairchild C-119 Packets, the 21st Troop Carrier Squadron, flying Douglas C-47's, and Marine Squadron VMR-152, flying Douglas R5D's (C-54's) were based there.

(The contribution of the Marine Corps to the Pacific lift was in two parts: VMR-152, flying with Tunner's CCC, and other Marine units with a total of 30 R5D's flying with the Fleet Logistic Air Wing Pacific).

The other part of Tunner's command, the 374th Troop Carrier Wing, flying Curtiss C-46's, was based at Tachikawa. The C-46's and C-47's worked chiefly on transport within Japan, while the bulk of the traffic

U. S. Carriers Contribution to Pacific Airlift

JULY 1950, THROUGH JANUARY 1951

	Outbound							Inbound						
	PASSENGER			CARGO				PASSENGER			CARGO			
Airline	Trips	No. Carried	Tons	Trips	Tons	Tons Total	Load Factor	Trips	No. Carried	Tons	Trips	Tons	Tons Total	Load Factor
Alaska	86	3,263	380.19	12	63.81	443.51	98.1%	38	1,047	118.55	35	126.00	244.55	66.8%
Calif. Eastern	21	750	91.47	35	146.57	238.04	97.6%	2	83	6.87	28	108.00	114.87	85.6%
Flying Tiger	83	2,532	297.89	99	456.86	754.75	98.0%	57	1,671	161.57	88	344.68	506.25	74.5%
Northwest	180	6,738	791.12	114	685.87	1,479.01	97.0%	127	2,966	328.08	118	436.07	764.15	68.0%
Overseas Nat'l	42	1,582	178.50	103	550.72	729.22	97.5%	33	1,028	108.17	96	415.11	523.28	75.0%
PAA (DC-4)	203	7,446	871.96	248	1,420.29	2,283.25	97.6%	164	5,540	567.84	271	1,119.73	1,687.57	78.8%
PAA (B-377)	40	2,703	313.70	...	.86	314.56	98.0%	37	1,984	199.40	2	9.52	208.92	69.3%
Seaboard & West.	57	2,565	299.81	113	648.18	947.99	96.8%	40	1,252	131.25	108	516.90	658.15	82.5%
Transocean	101	3,506	406.97	88	440.25	847.22	97.8%	81	2,474	256.44	100	362.84	619.28	74.5%
United (DC-4)	63	2,125	255.10	91	471.42	726.51	98.1%	50	1,574	155.89	81	364.95	520.84	81.6%
United (DC-6)	23	1,168	126.36	2	23.74	149.76	98.0%	23	888	84.76	1	11.13	95.90	83.0%
TOTALS	899	34,378	4,013.07	905	4,908.57	8,913.82	97.6%	652	20,507	2,118.82	928	3,814.93	5,943.76	75.6%

to Korea was handled by the bigger ships, the C-119's and the C-54's.

Perhaps CCC's most spectacular mission was the Pyongyang paradrop, in which C-119's and C-47's dropped some 6,000 troops of the 11th Airborne Division's 187th Airborne Regiment on the small villages of Sukchon and Sunchon, 25 miles north of the North Korean capital. The mission was highly successful; the troops fanned out, set up road blocks to cut off retreating Communists and established an "anvilhead" against which the North Korean army could be crushed by the main body of the U.N. force moving up from the south.

CCC flew other missions almost as spectacular: the recent second paradrop in the Seoul area, the dramatic evacuation of cut-off troops in the Hamhung region. But the real contribution of the command to the prosecution of the war in Korea was in the day-by-day routine shuttling of supplies and equipment to the ground armies.

Front-Line Supply

A front-line supply mission to the small town of Sinmak, about 25 miles from the North Korean capital (made last October as the U.N. forces were driving northward before the intervention of the Chinese Communists) serves as an excellent illustration of the type of tactical transport support CCC provided the ground forces.

Eight hours after Sinmak was taken C-54's and C-46's of CCC were landing on Sinmak's 2,500-foot sod runway tucked away behind a circle of 2,000-foot hills with the supplies that would enable the Eighth Army to keep moving in pursuit of the fleeing Reds. Sinmak was not an isolated case; throughout the entire war CCC kept up this type of operation.

Latest available figures show that CCC lifted a total of 165,949 tons of cargo and passengers during the Korean war. This includes 326,951 Korea-bound troops and medical evacuees from the war zone. CCC flew about 125,000 plane hours and made 42,111 sorties. Only 5% of its total tonnage was air dropped, and only one-half of 1% was troop drop. The remaining 94½% was air landed, since CCC's commanders felt it was far cheaper and more efficient to land its cargo wherever possible.

Phase Three

The Fleet Logistic Lift

The Korean war is generally thought of as strictly a land operation, but due to the fact that Korea is a peninsula projecting from the main body of the China land mass there was plenty of opportunity for fleet action. The battleship Missouri, aided by smaller ships, kept up a steady pounding of the enemy coastline while aircraft carriers dispatched their planes on ground support missions, backing up the Air Force's land-based effort. To keep this fleet in action plenty of supplies and equipment were needed, and since MATS and CCC were busy in other directions, the job fell to the Navy's Fleet Logistic Air Wing Pacific, or FLAWPac.

On June 25, when the North Koreans drove southward, FLAWPac was little more than a training unit. It had been organized earlier in the year as an air transport unit of the Pacific Fleet.

Commercial Aircraft Now in Pacific Lift

Alaska Airlines	3
American Airlines	5
California Eastern	3
Capital Airlines	2
Flying Tiger Line	7
Northwest Airlines	1
Overseas National	5
Panagra	1
Pan American	7
Seaboard & Western	7
Transocean	7
Trans World	5
United Air Lines	6
Western Air Lines	1
TOTAL	60

There were three squadrons: VR-5, based at Moffett Field, Calif.; VR-2, based at Alameda, Calif.; and VR-21, based in Hawaii.

The combined three squadrons had only seven four-engined planes on June 25: four Martin JRM Mars flying boats and three Douglas R5D (C-54) land planes. The remainder of FLAWPac's equipment was in twin-engined landplanes like the Douglas R4D (C-47) and small seaplanes used for short haul shuttle missions.

Average utilization throughout the wing was only three hours a day and only a very small portion of the four-engined air lift was in support of Far East operations.

How FLAW Grew

In July FLAWPac grew. Eight R5D's were diverted from the Atlantic theater and one more from the Continental theater to FLAWPac. Then the Marine Corps was called upon for assistance and it responded with 30 R5D's. This gave FLAWPac a total of 53 R5D's, plus the four JRM's, to provide logistic support for the fleet. At the same time, utilization of aircraft was increased to 5½ hours a day. FLAWPac started flying cargo and passengers from the West Coast and Hawaii to fleet bases in Japan.

By the first of September utilization was up to 7½ hours a day and by the end of that month it had increased to 8½ hours. During the first 60 days of operation FLAWPac flew 3,402 passengers and 312 tons of cargo to fleet bases in Japan. These are the last figures available as to FLAWPac's contribution to the Pacific air lift, since the Navy has not released overall tonnage figures.

FLAWPac's effort was not the only Navy Contribution to the lift. Navy squadrons VR-3 (Moffett Field) and VR-8, operating 15 and 12 R5D's respectively, flew with MATS throughout the lift. No breakdown is available as to what portion of the MATS tonnage they flew.

25 years ago, when United began operations, commercial airlines carried about 6000 passengers a year. Last year, over 17,000,000 passengers traveled on scheduled airlines. Now more people fly United in a single day than the entire industry carried in a year, 25 years ago. More and more people are using fast, comfortable, and dependable Mainliners to save time and money when they travel and ship. The oldest airline in the country, United is the Nation's Number 1 Coast-to-Coast Airline.

UNITED AIR LINES

FOR RESERVATIONS, CALL OR WRITE UNITED OR AN AUTHORIZED TRAVEL AGENT.

PASSENGERS • MAIL • EXPRESS • FREIGHT • AIR PARCEL POST

© U.A.L. 1951

there's a reason!

every fighter | every bomber | every transport **Hydro-Aire equipped!**

HYDRO-AIRE
INCORPORATED

Burbank, California
500 Fifth Avenue
New York, N. Y.

Engineers and Manufacturers of Control Valves, Filters, Hydraulic, Electric, Fuel and Oil Equipment and other vital components for tomorrow's aircraft

Air Evacuation—

. . . extra dividend of strategic airlift

AIR EVACUATION of sick and wounded military personnel originated during World War II, but it was in the Korean conflict that it reached the height of its development, for in the Korean war evacuation by sea transport was forsaken in favor of the speedier and more efficient product of the air age—airlift.

Perhaps the chief advantage of air evacuation is the speed with which sick and wounded are moved to medical centers where they can receive proper attention, a factor which has saved an indeterminable number of lives and limbs. But aside from the humane aspects, air evacuation has other advantages in the efficient utilization of aircraft and personnel.

First is aircraft utilization. Formerly, the movement of troops and cargo to areas where they were needed was the primary mission of strategic military airlift and evacuation was a secondary mission. Now, however, to use the words of MATS' commander, Maj. Gen. Laurence S. Kuter, "strategic air transport is a two-way street. We carry critical cargoes where needed, but, equally important, we bring back the military sick and wounded. Air evacuation, as a return trip by-product of strategic airlift, is also a primary mission."

Uses Back-Haul Space

Kuter calls air evacuation the "extra dividend" of strategic airlift, since medical evacuees can be carried on returning aircraft which ordinarily might go back empty after discharging their cargo loads. Standard aircraft, slightly modified for litter installation, are generally used for evacuation, but MATS has carried evacuation a step further by developing a special convertible cargo-evacuation plane, the Douglas C-54M.

The "M" is a modification of the standard C-54 containing a number of new features essential to the long-range transportation of wounded, which, however, were installed without sacrificing any of the plane's cargo-carrying capabilities. Thus the C-54M can carry a cargo load into a war theater and lift 32 litter patients on the way out.

Another major advantage of air evacuation, as opposed to sea transport evacuation, is utilization of medical personnel, a very important factor in view of the shortage of doctors and nurses. A study made for the Joint Chiefs of Staff showed that 21 times more medical personnel were required for moving patients by surface vessel than by air.

AIR EVACUATION of wounded is now a big business and MATS is developing it to the hilt. Here litter patients are being loaded aboard a Douglas C-54 through use of a specially designed adjustable ramp. The new ramp replaces the old fork-lift method and cuts loading or unloading time in half.

Sea transports require several days (and sometimes weeks) to travel to designated hospitals. A typical hospital ship moving 300 patients 10,000 nautical miles, therefore, requires a staff of 126 medical attendants, including eight doctors. The same 300 patients transported a like distance by air require only three or four medical attendants and no doctors.

The morale boost given air evacuees by their speedy trips to stateside hospitals is considered another major advantage. On a recent inspection trip of the Pacific airlift, Kuter personally talked with many air evacuees, who were almost unanimous in their preference for the not-too-comfortable airborne litters over more comfortable ship quarters.

Air evacuation also affords a reduction in the overall military budget by eliminating hospital ships and by decreasing the ton-mile cost of aircraft operation through utilization of homeward-bound space which might otherwise not be used.

Medical air evacuation became a big business in the Korean war. Combat Cargo Command (now the 315th Air Division) lifted more than 75,000 medical air evacuees from Korea. All of these were not flown back to the U. S., but MATS returned to the U. S. by air well over 20,000 sick and wounded during the Korean campaign.

The greatest number of evacuees carried on one trans-Pacific trip was 74 in a Douglas C-74. Some C-54's have carried as many as 62 litter patients on one shorter-haul flight from Korea to hospitals in Japan. The Boeing C-97 Stratofreighter ordinarily carries 60 patients on trans-Pacific flights.

Patients Evacuated by MATS

From Pacific and Japan

June 25, 1950, Through February, 1951

Month	War Casualties	Patients*	Total
July	80	455	535
August	935	443	1,378
September	2,690	554	3,244
October	1,889	632	2,521
November	1,376	416	1,792
December	5,492	860	6,352
January	1,699	525	2,224
February	1,570	437	2,007
TOTAL	15,731	4,322	20,053

* "Patients" are military personnel or their dependents taken ill in the Pacific occupation zone, as distinguished from battle casualties.

WOUNDED SOLDIER in Korea being evacuated by an Air Rescue Service Sikorsky H-5 helicopter. H-5's of the 3rd ARS performed almost 900 such evacuations, rescued 165 from behind enemy lines.

Helicopter Proves Lifesaving Value in 1,200 Air Rescues

THE KOREAN war gave Air Rescue Service the Air Force's lifesaving unit, an opportunity to demonstrate its worth, and at the same time it gave the helicopter a chance to prove its value. Both came through with flying colors, as some 1,200 military personnel will testify. That's the number of men who were saved by ARS from either death or imprisonment. And the helicopter, in this case the Sikorsky H-5, accounted for almost 90% of the total "saves."

ARS went into action almost the day the Korean war started, since the organization was fortunate enough to have a unit, the 3rd Air Rescue Squadron, stationed in Japan at the time. One of the first ARS missions was the evacuation of South Korean government officials from Seoul. Since that time, flying helicopters, amphibians, light transports, liaison craft and converted search-bombers, ranging as far as 125 miles behind enemy lines, ARS has effected close to 200 "retrieves" behind enemy lines and about 1,000 evacuations from other areas.

The helicopters carried the brunt of the work, flying as many as 50 missions a day with only a handful of planes assigned, flying sometimes as much as 18 hours a day.

But the work of ARS is not confined to combat rescue. Its major peacetime mission is saving the lives of military airmen who, for one reason or another, are forced to crash land or ditch their planes. This is accomplished by search, to find the survivors; by airborne drop, to provide them with food, medical supplies and attendants, etc.; finally, by lift to the nearest base.

ARS also serves civil agencies when called upon. ARS' "moral mission" is "the safeguarding of life and government property, wherever the need arises." This might include aiding in the search for a lost youngster in the Maine woods, the search for and rescue of a flying American missionary in the Philippines, the delivery of food and medicine to snowbound ranches and communities in the Midwest, or the dropping of a para-doctor to aid a crashed civilian pilot on a frozen lake in the Pacific Northwest.

ARS is a division of Military Air Transport Service. Headquarters is in Washington, D. C., and the organization is commanded by Col. Richard T. Kight, a 37-year-old Texan who has over 5,000 flying hours, chiefly in transport aircraft. ARS has been in business since early 1946 and Kight has commanded it since the latter part of that year.

10 Rescue Squadrons

ARS is organized in 10 separate Air Rescue Squadrons scattered over the globe. They are: **the 1st,** at MacDill Air Force Base, Fla.; **the 2nd,** Clark AFB, Luzon, P.I.; **the 3rd,** Irumagawn, Japan; **the 4th,** Hamilton AFB, Calif; **the 5th,** Westover AFB, Mass.; **the 6th,** Pepperell AFB, St. Johns, Nwfld.; **the 7th,** Wheelus AFB, Tripoli; **the 8th,** Bushy Park, Teddington, England; **the 9th,** Elmendorf AFB, Anchorage, Alaska; and **the 10th,** Hickam AFB, T.H. Each squadron has three or four flights spread out over the area assigned it to cover. For instance, the 5th ARS, with headquarters at Westover AFB, has one flight at Westover and one each at Ellington AFB, Tex., Maxwell AFB, Ala., and Selfridge, AFB, Mich.

Each flight has four airborne life-boat carriers or four amphibians, one transport plane and two helicopters. Some squadrons also have liaison planes. The airborne life-boat carriers in service are converted wartime bombers—Boeing SB-29's and SB-17's. The standard amphibian is the Grumman SA-16. The transport plane may be either a Fairchild C-82 Packet of a Douglas C-47. The standard helicopter is the Sikorsky H-5 and the standard liaison plane the Stinson L-5.

During 1950, ARS units (exclusive or Korea) were alerted 8,175 times; 6,981 turned out to be false alarms.

ARS Rescues in Korean War

June 25, 1950, to February 28, 1951

Aircraft	Retrieves from Behind Enemy Lines	Evacuations from Other Areas	Rescues from Sea	Total
SB-17	0	10	1*	11
SA-16	0	17	11#	28
C-47	0	23	0	23
H-5	165	885	1#	1051
L-5	17	58	0	75
Total	182	993	13	1188

* Boat Drops. # Water Landings.

MODERN AERIAL WEAPONS *depend on electronic experts' little black boxes —circuits, tubes and gadgets that help man overcome his physical limitations in his constant conquest of the Air.*

Opportunities for ELECTRONICS ENGINEERS

The advance of electronic research and development, especially in the last five years, has been so rapid that a great demand for engineers and technicians has been created. This is especially true at the Martin Company . . . one of the country's leaders in airborne electronic research since before V-J Day . . . with such developments as control systems for guided missiles like the KDM-1 Plover target; the Viking high-altitude research rocket; fire control systems for turrets and much other advanced work still classified under military security.

Martin needs engineers with experience in research and development of radar, television, pulse and display circuits . . . and, in the electro-mechanical field, experienced engineers in armament, servo-mechanisms, electrical work, rocket propulsion and special weapons or systems design.

The Martin Company would like to have a resume of the background of anyone having experience in electro-mechanics or electronics. Such information should be sent to the Employment Manager, The Glenn L. Martin Company, Baltimore 3, Maryland.

They're putting wings on little black boxes

Many of our new winged weapons are pilotless. But even in today's piloted aircraft, man can't see far enough, can't move fast enough, can't live unaided at the temperatures and pressures he must endure. He needs the assistance of mechanical and electronic senses, muscles and nerves. That's why today's aerial weapons engineering demands a teaming of specialists in skills unheard of a decade ago.

Here at Martin, we call it *systems engineering*. Airframe and power plant, electronic flight and navigational controls and military armament—all are represented on a Martin engineering team that is designing aircraft as integrated airborne systems.

A Navy Viking high-altitude research rocket, missiles and target drones soaring into the blue. An Air Force XB-51 jet-powered ground support bomber roaring down in a simulated strafing run. A Navy P5M-1 Marlin being readied for sub-hunting duty. A dependable Martin Airliner gaining precious time for vacationist and businessman. All these are products of Martin *systems engineering*—part of a new trend in aeronautical designing that is putting wings on little black boxes —to help man overcome his physical limitations—to help him guard the peace and enjoy it.

THE GLENN L. MARTIN CO.,
Baltimore 3, Maryland.

Martin
AIRCRAFT
Builders of Dependable Aircraft Since 1909

Developers and Manufacturers of: Navy P5M-1 Marlin seaplanes • Navy P4M-1 Mercator patrol planes • Navy KDM-1 Plover target drones • Navy Viking high-altitude research rockets • Air Force XB-51 experimental ground support bombers • Martin airliners • Guided missiles • Electronic fire control & radar systems • Precision testing instruments • **Leaders in Building Air Power to Guard the Peace, Air Transport to Serve It.**

Martin Ads Tell Air Power Story

Reaching millions of informed, alert American magazine readers, Martin advertisements like this highlight air power's important role in our country's preparedness program.

Survey after survey has demonstrated that their story-style appearance attracts an extremely high readership and a worthy audience for the facts on this vital question.

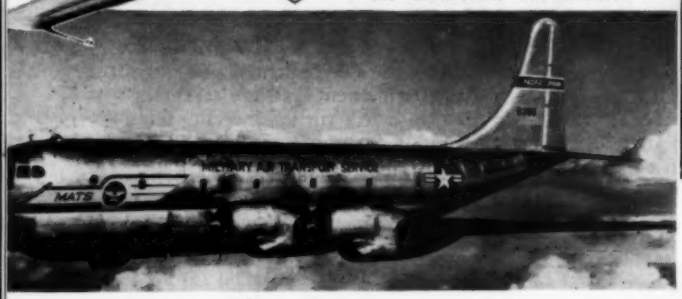
Air Force, N...

THE USAF and Navy operate a total of about two dozen military transport aircraft, designed for a variety of purposes, such as cargo hauling, troop carrying, personnel transportation, assault operations, etc. Although the bulk of the military fleets is still concentrated in types developed and produced in World War II, a number of new types have entered service in the past year and conversion to new, larger and faster transports is gradually getting under way. Shown on these pages is a cross-section of the military air fleet, new types and old.

Douglas C-124A—The largest transport in service, slated for MATS, Strategic Air Command and troop-carrier use. Already in SAC service and MATS has received two planes. 50,000-pound payload.

Boeing C-97A— Military version of the commercial Stratocruiser.

Douglas C-74—Forerunner of the C-124. About 10 in service and no further production planned.

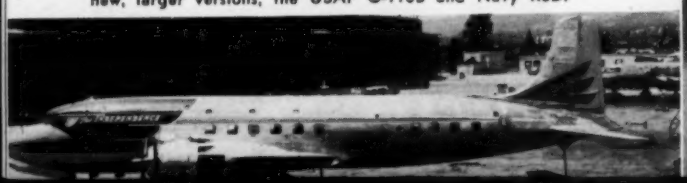


Douglas C-54 (Navy R5D)—Military version of the DC-4, over 1000 of which were built during World War II. No longer in production but still in wide service use by both USAF and Navy.

Martin JRM-2 Mars—Flying boat transport, four of which are in service with the Navy's Fleet Logistic Air Wing Pacific. No further production planned.

Lockheed C-121—Military version of the Constellation. Ten now in MATS service and both USAF and Navy have ordered new, elongated versions.

Douglas C-118— The Independence, the President's plane, is the only C-118 now in service, but both USAF and Navy have ordered new, larger versions, the USAF C-118B and Navy R6D.

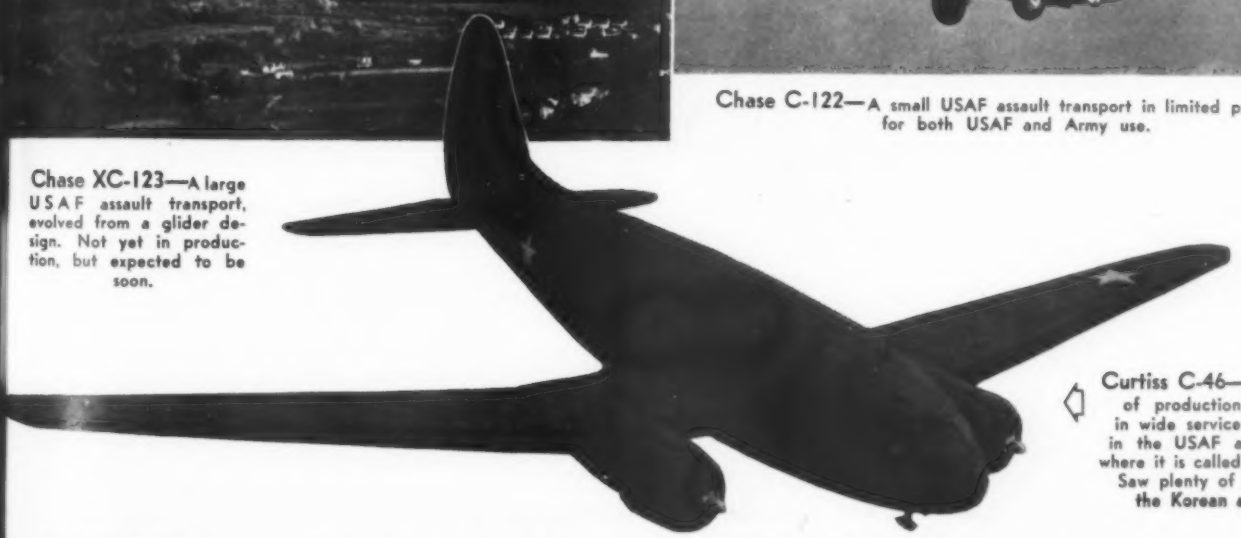


Swing Slowly to New Transport Types

Fairchild C-119—The USAF's standard troop carrier plane, also used by the Marines with the designation R4Q. In large-scale production.

Chase C-122—A small USAF assault transport in limited production for both USAF and Army use.

Chase XC-123—A large USAF assault transport, evolved from a glider design. Not yet in production, but expected to be soon.



Curtiss C-46—Long out of production but still in wide service use both in the USAF and Navy, where it is called the R5C. Saw plenty of service in the Korean airlift.

Northrop C-125—Another assault transport, also used for Arctic rescue work. In limited production.

Douglas C-47—The old work-horse of military transport. No longer in production, but about 1,600 are still in service.

Jet Transport Lacking in Procurement Plan

. . . accent on large-capacity planes

THE military services currently have in production about a dozen different transport types, the accent being on new, large-capacity planes. Neither service has evidenced much interest in development of a jet transport, the only step in that direction having been taken by the Air Force, which conducted an evaluation of the Avro Canada C.102 jet transport. The C.102, however, was considered only as a possible advanced multi-engined trainer, not as a service transport.

The USAF has several separate transport requirements: planes for Military Air Transport Service, for the Strategic Air Command's transport units, for troop carrier service and for Army support.

C-97 Stratofreighter

Heaviest Air Force procurement concentration is on the Boeing C-97 Stratofreighter, military counterpart of the commercial Stratocruiser, which is becoming MATS' prime airplane. The C-97 is already in MATS service. It is also being bought for SAC both as a transport and an aerial tanker. Specifications:

Wing span .....141 feet 3 inches
Length .....110 feet 4 inches
Height .....38 feet
Gross weight .....142,500 pounds
Payload (normal) ..45,000 pounds
Top speed ....350 miles per hour

Douglas C-124

Another plane being emphasized in the USAF's current procurement program is the Douglas C-124, largest transport type in production. The C-124, a four-engined heavy transport powered by Pratt & Whitney R-4360 Wasp Major engines, is being ordered for MATS, for SAC, and for troop carrier work. Deliveries started about the end of last year and SAC now has one full squadron, while MATS is just getting its first planes. Specifications:

Wing span .....173 feet 3 inches
Length .....127 feet 2 inches
Height .....48 feet 3 inches
Gross weight about 180,000 pounds
Payload .....50-60,000 pounds
Top speed ....250 miles per hour

The Air Force has contracted for an experimental turboprop version of the C-124, using Pratt & Whitney T-34 engines, but has ordered no production of this model.

Military Transport Types in Production

USAF

Company	Designation	Type
Boeing	C-97	Four-engined heavy transport
Douglas	C-124	Four-engined heavy transport
Fairchild	C-119	Twin-engined troop carrier
Douglas	C-118B	Four-engined medium transport
Lockheed	C-121C	Four-engined medium transport
Chase	C-123	Twin-engined assault transport
Northrop	C-125	Three-engined assault transport
Chase	C-122	Twin-engined light assault transport

Navy

Convair	R3Y	Four-engined turboprop flying boat transport
Fairchild	R4Q	Twin-engined Marine troop carrier
Douglas	R6D	Four-engined medium transport
Lockheed	R7O	Four-engined medium transport
Douglas	R4D-8 (Super DC-3)	Twin-engined light transport

C-119 Packet

Standard troop carrier transport is still the Fairchild C-119 twin-engined Packet, being ordered in such quantities that both Fairchild Aircraft Division and Kaiser-Frazer Corp. will build them. Present versions of the C-119 are powered by Pratt & Whitney R-4360 Wasp Major engines, but a new model which will go into production later this year will have Wright R-3350 engines. Specifications:

Wing span .....109 feet 3 inches
Length .....85 feet 10 inches
Height .....26 feet 8 inches
Gross weight .....64,000 pounds
Payload .....20,000 pounds
Top speed .....265 miles per hour

Airline-Type Transports

Up until the start of the Korean war, the USAF had shown little interest in airline- type transports, preferring the larger, specially-designed military transports. Now, however, the Air Force has decided it needs a number of airline-type planes for special purposes and has ordered two types in limited quantities, the Douglas C-118B and the Lockheed C-121C. The C-118B is the military designation for Douglas' DC-6A Liftmaster, elongated cargo version of the DC-6, powered by four Pratt & Whitney R-2800-CB-17 engines. The C-121C is the military version of Lockheed's L-1049 Constellation, also an elongated version of the basic Constellation. Both types will probably go to MATS. Specifications:

Douglas C-118B

Wing span .....117 feet 6 inches
Length .....105 feet 7 inches
Height .....28 feet 5 inches
Gross weight .....103,000 pounds
Payload .....30,000 pounds
Top speed ....360 miles per hour

Lockheed C-121C

Wing span .....123 feet
Length .....113 feet 1 inch
Height .....18 feet 8 inches
Gross weight .....130,000 pounds
Payload .....34,000 pounds
Top speed ....365 miles per hour

Assault Transports

The Air Force currently has two assault transport types in limited production and has tentatively scheduled a third, larger type, although the contract for the latter plane, the Chase XC-123, has not yet come through. The two types now being built are the Northrop C-125, a three-engined plane powered by Wright R-1820 engines, and the Chase C-122, a twin-engined type powered by the same engine. The XC-123, winner of the USAF's assault transport competition, was evolved from a glider design; it is a twin-engined plane powered by Pratt & Whitney R-2800 engines (an alternate possibility is the Wright R-3350 engine). Specifications:

Chase C-122

Wing span .....95 feet 8 inches
Length .....61 feet 8 inches
Height .....24 feet 8 inches
Gross weight .....40,000 pounds

●A famous general of the U.S. armed services recently said, "When an airplane is sitting on the ground, it's going to waste."

This applies to commercial air transports as well as to military aircraft. And today, when *all* aircraft are vitally needed to help sustain our fighting forces overseas and our defense drive at home, Douglas is making every effort to keep more airplanes in the air more hours.

Much of this effort consists of manufacturing and delivering spare parts. For, under stepped-up flying hours, aircraft parts need replacement more often. Without them the plane is "going to waste."

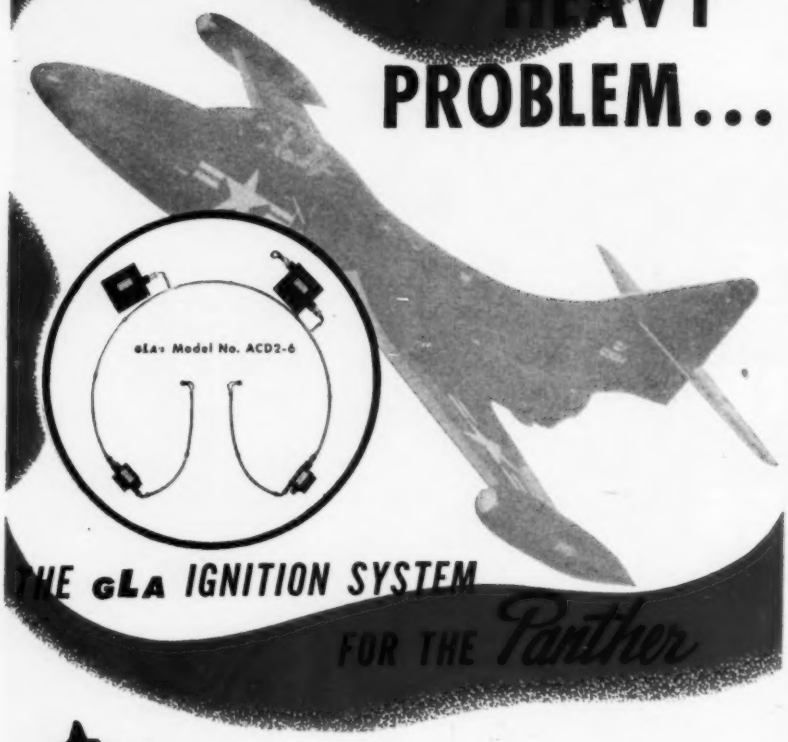
Supplying tons of spare parts every month for aircraft in all parts of the world is just one segment of the vast Douglas operation. In addition to the many aircraft models currently coming off the production lines, Douglas engineers and research experts have under development advanced types of aircraft, guided missiles and electronic equipment.

Depend on **DOUGLAS**

Skilled engineers and technicians find Douglas a good place to work!

WORLD'S LARGEST BUILDER OF AIRCRAFT FOR 30 YEARS ▲ MILITARY AND COMMERCIAL TRANSPORTS
FIGHTERS ▲ ATTACK PLANES ▲ BOMBERS ▲ GUIDED MISSILES ▲ ELECTRONIC EQUIPMENT ▲ RESEARCH

THE LIGHTWEIGHT ANSWER TO A HEAVY PROBLEM...



THE GLA IGNITION SYSTEM FOR THE *Panther*

On the Grumman F9F, ounces count; that's why you'll find the lightweight GLA *high energy condenser discharge system* doing a real heavyweight job! The Model ACD2-6 system for the Panther incorporates reliable performance from advanced electronic development with the latest weight and space saving design. Engineering and building this component for the Pratt & Whitney Nene jet engine is another example of GLA's leadership in solving the complex problems of electronic design involved in jet and supersonic aircraft.

An experienced technical staff with production facilities invites your inquiry. ***Write today.***

GENERAL LABORATORY ASSOCIATES INC.

NORWICH, NEW YORK

GLA

AIRCRAFT AND ELECTRONIC PRODUCTS

Payload ..1½-ton truck, 75mm gun and jeep, or comparable equipment combination; 30 troops or 24 litter patients
Top speed ....240 miles per hour

Northrop C-125

Wing span .....86 feet 6 inches
Length .....67 feet 1 inch
Height .....23 feet 2 inches
Gross weight .....38,000 pounds
Payload .....11,000 pounds
Top speed ....235 miles per hour

Chase C-123

Wing span .....110 feet
Length .....77 feet 1 inch
Height .....32 feet 8 inches
Gross weight .....54,000 pounds
Payload ...155mm howitzer and prime mover or comparable equipment combination; 60 troops or 50 litter patients, 6 ambulatory patients and 6 attendants
Top speed ....245 miles per hour

Navy Procurement

The Navy has two transport plane requirements: for the Fleet Logistic Air Wings, air transport arm of the fleet, and for the Marine Air Transport Wings. For FLAW, the Navy is currently buying four types, two of which, the Douglas R6D and the Lockheed R70, are airline types. The R6D is the Navy designation for the Douglas DC-6A Liftmaster and the R70 is the Navy version of the Lockheed L-1049 Constellation. Specifications of both planes correspond to their Air Force counterparts, above.

For short-haul work in FLAW, the Navy is buying a large number of Douglas Super DC-3's, which carry the Navy designation R4D-8. The R4D-8 is a modernized version of the old military C-47 or R4D. Specifications:

Douglas R 4D-8

Wing span .....90 feet
Length .....67 feet 8 inches
Height .....18 feet 3 inches
Gross weight .....31,000 pounds
Payload .....12,900 pounds
Top speed ....270 miles per hour

In its current operation, FLAW employs flying boat transports (Martin JRM Mars) for certain types of missions. To replace the JRM's, the Navy is now ordering a new flying boat transport, the Consolidated Vultee R3Y. The R3Y is a four-engined turboprop plane, developed from the XP5Y-1, orginally designed as a patrol bomber.

The major transport requirement of the Marine Corps is a troop carrier plane and the Navy has ordered a large number of Fairchild R4Q twin-engine transports for this purpose. The R4Q is the Navy version of the USAF's Fairchilds C-119 Packet. Specifications of the R4Q are basically the same as those listed above for the C-119.

Only

EL INTER AMERICANO

flies the "Gateway Route"

to

South America

● Because few people outside the field of transportation realize that practically all of South America lies East of Miami, this upside-down map, in its original 4 colors, appeared recently in Time Magazine. It let over 2 million readers sight straight down Panagra's Gateway Route—from Miami* due south via Panama, Guayaquil, Lima, and Santiago. It shows that no matter where you live in the U.S.A., Miami is your Gateway to all South America. First, finest, and fastest way to Buenos Aires is Panagra's daily deluxe DC-6, *El InterAmericano*.

PAN AMERICAN-GRACE AIRWAYS

*From Miami to Panama over the routes of Pan American World Airways.

MAKING NEWS... MAKING HISTORY!

C-119's SUPPLY TRAPPED FORCES WITH 113 TONS

Drop Accomplished On Half "Football Field" at 800 Feet

HQS, FEAF COMBAT CARGO COMMAND, AIRLIFT BASE, JAPAN—(A.T.)—Again exercising the flexibility of airlift operations, eighteen C-119 Flying Boxcars of the 314th Combat Cargo Wing roared out from this base yesterday with 113 tons of critically needed war materials for embattled United Nations forces in the Chosin Reservoir area.

Immediately after the emergency request for these supplies was received, loading crews began lashing the mixed cargo of gasoline, rations, ammunition and other materials to pallets and loading them aboard the huge cargo carriers. Each aircraft departed for the drop zone as soon as it was loaded.

Seven of the Flying Boxcars reached the drop zone befo

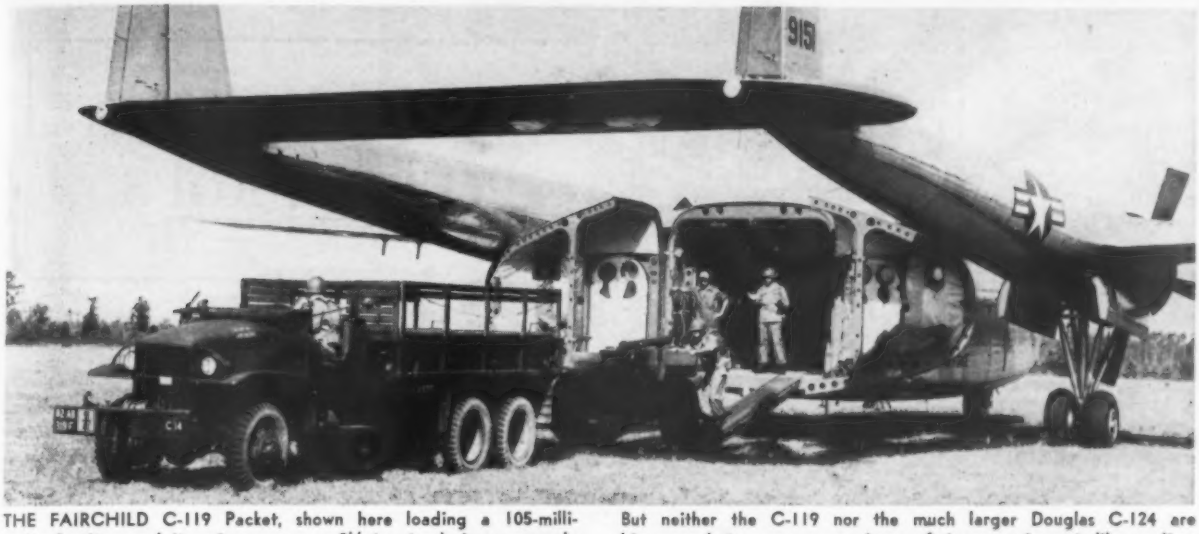
ENGINE AND AIRPLANE CORPORATION

FAIRCHILD

Aircraft Division

HAGERSTOWN, MARYLAND

Fairchild Engine, Guided Missiles, and Stratos Divisions, Farmingdale, N.Y.



THE FAIRCHILD C-119 Packet, shown here loading a 105-millimeter howitzer and its prime mover, a 2½-ton truck, is an example of the type of plane needed to haul the air-transportable division. But neither the C-119 nor the much larger Douglas C-124 are big enough to carry some pieces of Army equipment, like medium or heavy tanks.

AIR TRANSPORTABLE DIVISION—WHEN?

Flying Army Needs More and Bigger Planes

THE UNITED STATES, even under the most drastic mobilization program, can never support sufficient ground forces in all the world's trouble spots to meet aggression, should it come, since the country does not have the manpower and equipment resources to man such defenses and still maintain the national economy. For this reason the air-transportable division has long been the goal of Army commanders.

At the moment it is little more than a goal for Army commanders are not interested in building *one* completely air-transportable division, but in maintaining a pool of aircraft which could transport *all* the infantry divisions, and there just aren't that many aircraft available for the job. But progress is being made toward air transportability, if not in numbers of planes, at least in the development of new types specially designed for that purpose.

Development and introduction into service of the huge Douglas C-124 was a major step toward bringing about the air transportable division, for the C-124 can carry equipment which no other plane can handle. The C-124 can carry a light tank or an 8-inch howitzer plus its prime mover, or a 155-millimeter gun and its prime mover, or heavy engineer equipment, or three fully-loaded two and one-half ton trucks. But there are still certain pieces of equipment the C-124 can't handle, which require larger aircraft like the 100,000-pound payload XC-99, only one of which is in existence and no production of which is scheduled.

To illustrate the problem of air lifting armored division units, let's assume we have a team of three transport types—a heavy like the C-124; a medium, like Fairchild's C-119 Packet; and a light, such as the Chase C-122 or Northrop C-125. Lt. Col. George B. Pickett, Jr., of the Infantry School, Fort Benning, Ga., supplied the following requirements to air lift one armored infantry battalion:

Battalion Load

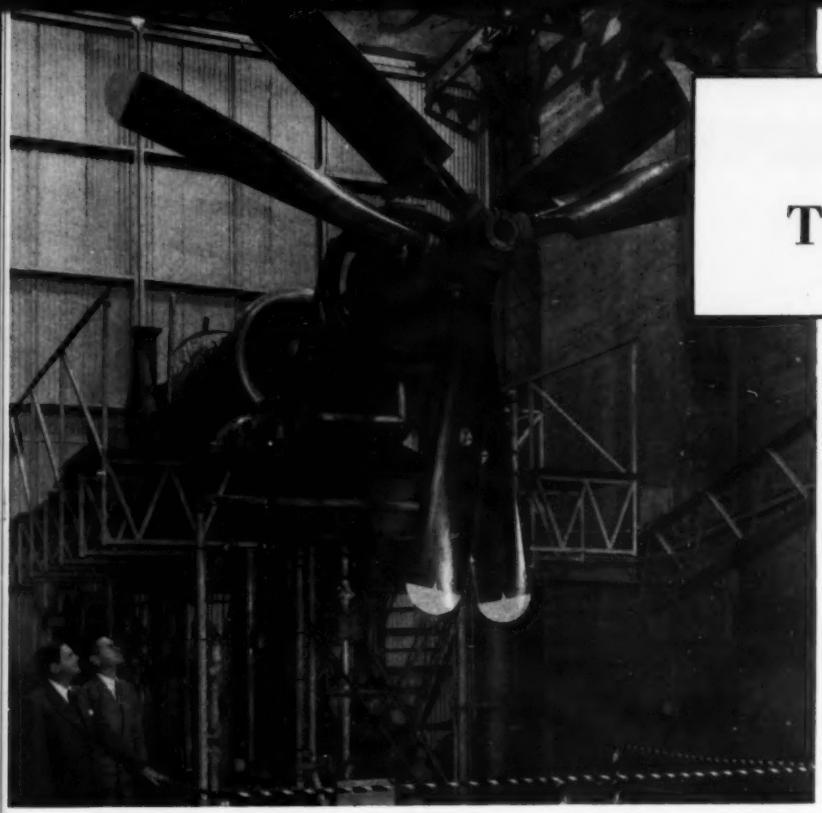
- 75 loads each consisting of one armored personnel carrier and three personnel, *weight per load 48,720 pounds*
- one load consisting of one heavy wrecking truck and three personnel, *weight 28,050 pounds*
- two loads each consisting of one light tank and four personnel, *weight 42,960 pounds*
- three loads each consisting of one half-track mortar carrier and two personnel, *weight 15,980 pounds*
- 22 loads each consisting of one loaded two and one-half ton truck, *weight 16,010 pounds*
- six loads each consisting of four one-ton trailers, loaded, and nine personnel, *weight 16,160 pounds*
- one load consisting of three loaded ammunition trailers and 16 personnel, *weight 16,110 pounds*

The above loads can be handled by the heavy and medium aircraft. Since they include a total of 312 personnel, that leaves an additional 728 men, plus the battalion's complement of one-quarter and three-quarter ton trucks, to be carried in the light transports.

The total requirements in terms of planes, assuming availability of the types mentioned above, would be *78 C-124's, 32 C-119's and 39 C-122's or C-125's.* And this lift covers only the light tank battalion of the armored division.

Since there are 13 battalions in a modern armored division, it can readily be seen that the lift requirements in terms of planes are staggering, even though some of the battalions, like infantry and ordnance battalions, do not require as much heavy equipment. A medium tank battalion could not be lifted at all with present types of aircraft, since even the C-124 cannot carry medium tanks.

Thus it is apparent that air transportability for our ground forces is still quite a way off. First, we must build planes especially designed for such work in vastly greater quantities, and second, we must design and put into production larger planes, of the order of the XC-99, which can carry medium and heavy tanks and other specialized pieces of ground force equipment not now air transportable.



IN THE NEWS

TURBOPROPS

The Turbodyne, most powerful propeller-type aircraft powerplant in the country, delivers more than 8000 horsepower in addition to an undisclosed amount of thrust. Here, Jim LaPierre, manager of G-E's Aircraft Gas Turbine Divisions, and Virg Weaver, in charge of the Turbodyne project, take a look at the engine on the stand where it is undergoing rigorous tests.

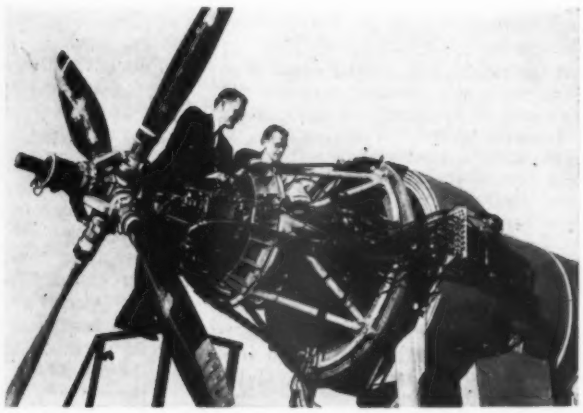
Ten years ago, in July, 1941, G-E engineers started work on a new type aircraft powerplant—an axial-flow gas turbine driving a propeller. This was the TG-100, the first turboprop in the country and the forerunner of future powerful engines.

General Electric engineers today are experimenting with the Turbodyne, a Northrop development. Although larger than required for today's transport needs, the Turbodyne presents an ideal vehicle for testing new ideas and methods.

New and improved turboprop engines are in the books at General Electric. Light weight and high powered, these engines will someday be lifting new aircraft to new uses and new records.

When you're considering powerplants, call in the company that pioneered the aircraft gas turbine industry. Telephone your General Electric aviation specialist, or write General Electric Company, Schenectady 5, N. Y.

Convair XP-81, first turboprop-powered aircraft to fly in U.S., powered by TG-100, first American turboprop.



Design engineers Alan Howard and C. J. Walker, inspect an early TG-100 turboprop on test stand in Schenectady.

AIRCRAFT GAS TURBINES

GENERAL ELECTRIC

210-22

AS THE ONLY turbine-powered commercial transport in the country, the Allison-sponsored Convair Turboliner (left) is assured a place in the prototype aircraft testing program, providing Allison is willing to have the plane used in this manner. Earliest date at which it might be started under the program is January 1952. The Chase C-122 (right) made its place among the aircraft favored for prototype testing because it has the high wing, low-level loading entry and Wright R-1820 engines. The high wing and low-level floor is favored by the cargo operators and the Wright R-1820 was unofficially cited as the desirable engine for a feeder-type airplane by local service airline representatives. USAF has yet to give its approval to loan of three planes for the test program.

Turbine Transport Tests Coming Soon

$2-Million Plan Includes 'Copter, Cargo Plane

By WILLIAM D. PERREAULT

IN 1950 many of the airlines made important decisions on new equipment which ruled out turbine-powered transports in commercial use in the United States for some time to come, probably until 1954-55 at best. Instead the U. S. airlines have settled down to the idea of making the most of postwar conventional transport types for some indefinite period while manufacturers and military improve the basic product.

Airlines such as Eastern, American, United, Trans-World, Pan American —all in a position to experiment with the new types if the objective appeared advisable, turned to ordering additional Douglas DC-6's, Lockheed Constellations, Martin 4-0-4's and Convair 340's.

They did not turn their backs on turbine transports. With rapid developments taking place in turbine-propeller engines, the manufacturers and airlines worked out minor modifications to these conventional aircraft to permit an easy transition to turboprop engines when the engines are ready and available and some of the operational problems have been worked out.

Much to Learn

The fact is that much remains to be learned about the operational end of turbine-powered aircraft before they are used for commercial passenger service. Allison Division of General Motors, through its work with the Convair Turboliner, and General Electric, through its operation of the North American B-45 using airline crews, are both making major contributions to this fund of knowledge.

Meanwhile the U. S. Navy's Convair P5Y, powered by Allison turboprop engines, is accumulating valuable experience and the USAF's decision to put the Douglas YC-124B in the air with Pratt & Whitney's T-40 turboprop will provide directly applicable service data.

Engine reliability is improving but is still one of the major factors which causes commercial operators to shy

HELICOPTER portion of the prototype testing program may be handled with either a twin-rotor or single-rotor helicopter as shown here but ultimately CAA will probably require a twin-engined helicopter for unrestricted passenger service. Shown here are two of the three principal helicopters under consideration: the Piasecki HUP-1 (left) and the Sikorsky S-55. Third is the Bell 48.

MAGNIVISION
FOR SURFACE INSPECTION

A Production Inspection Tool — Does the job of Costly Inspection Devices in less time

Surface inspection of machined parts is only one of the many and varied uses for MAGNIVISION in your shop.

The use of MAGNIVISION will give improved vision to all your workers and they will find many uses for it. They will use it more and more for fine detail and accurate work and it will increase production, improve efficiency and decrease work fatigue caused by improper lighting.

Write to Dep't AA for complete information

ENGINEERING DEVELOPMENTS INC.
Portsmouth, Newport, Rhode Island

THERE WERE 139 North American B-45's built. CAA, charged with making the prototype aircraft testing program operate, would like to use four of these planes in simulated airline operation to gain experience with turbojet engines on all phases of operations. No final decision has yet been reached on the loan of these aircraft but USAF is taking an active interest in the prototype testing and the program has high Congressional backing.

away from turbine power. Military developments have increased turbine engine power to almost four times that available even 12-18 months ago. With this increase in power have come improvements in specific fuel consumption which will one day make turbine engines more economically feasible than they have been in past years. This is a major factor.

Advances are to be seen on all fronts. The earlier fears that the British airlines would dominate the air routes of the world with turbine-powered aircraft while the U. S. was still making up its mind have subsided. Instead there is the "wait and see" attitude, a feeling that much will be learned from their operational experience.

$12.5 Million Authorized

Meanwhile, the U. S. airlines have something tangible to look toward in turbine aircraft developments. Congress authorized the expenditure of $12.5 million on prototype aircraft testing and the program is going along at a reasonable pace.

An authorization to spend $12.5 million on this work does not automatically provide the funds. Before funds are appropriated a specific program must be worked out showing the manner in which the money is to be spent. Such a program has been under development by the Prototype Aircraft Advisory Committee.

On the basis of the tentative program, CAA will ask Congress for $2 million of the authorized sum to start work in fiscal 1952 starting this July.

Four Plane Types

Present plans call for prototype testing to begin in July. On the recommendation of its technical committee, the PAAC hopes to test three specific aircraft types and one passenger helicopter:

- **The North American B-45** would be used to accumulate operational experience with all types of turbine powered aircraft.
- **The Convair Turboliner** would be used to gain information on use of turboprop engines in cargo and local service airline aircraft.
- **The Chase C-122** would be used to evaluate the practical aspects of a high-wing, low-floor-level cargo plane and local service airline aircraft.
- **A large transport-type helicopter,** presumably the Bell 48, Sikorsky S-55 or Piasecki HUP, would be used to investigate the operational and economic problems of this type craft.

None Available Yet

There is one big problem. At this date none of the four types of aircraft has been specifically made available for the program. The U. S. Air Force controls the North American B-45 and Chase C-122, the USAF and Navy control the helicopters, and Allison Division of General Motors controls the Convair Turboliner.

Initially CAA would like a single airplane of each type to carry on CAA certification tests. Shortly after these tests are under way it would be desirable to obtain two or three more of each type to carry on simulated scheduled operations.

With the critical international situation, the USAF and Navy are not quick to offer up current aircraft types for civil tests. It might well be argued that the military services would gain vital information from a controlled operation of this type. The British, it is said, started their whole postwar series of turbine aircraft in the darkest days of World War II.

The problem with the Convair Turboliner is evident. The only plane of this type in existence was purchased from Convair and modified to turbine power by Allison for re-

Aviation's Highest Award...

"To Mr. William P. Lear, Director of Research and Development of Lear Incorporated, for his outstanding achievement in the development, perfection, application, and production of the Lear F-5 automatic pilot and automatic approach control coupler system which makes possible the safe landing of jet aircraft regardless of extreme weather or visibility conditions."

The Collier Trophy is awarded each year by the National Aeronautics Association and presented by the President of the United States "for the greatest achievement in aviation in America, the value of which has been thoroughly demonstrated by actual use during the preceding year."

The Lear F-5 automatic pilot, the Lear automatic approach control coupler (for bringing aircraft automatically down the standard ILS beams to within a few feet of the runway without a human hand having to touch the controls), and Lear attitude indicating instruments, are now in quantity production for the U.S.A.F.

LEAR INC. GRAND RAPIDS, MICHIGAN • LOS ANGELES, CALIFORNIA • ELYRIA, OHIO

More People Than Ever Fly Mid-Continent

Throughout Mid-America more people than ever are switching to Air Travel!

The convenience of MCA's daily scheduled flights, the dependability and relaxing travel comfort, are winning new friends for air travel.

Figures prove this, with an increase of more than 6 million passengers miles over 1949

106,445,570
Passenger Miles Flown in 1950

MID-CONTINENT AIRLINES

"Let's become better acquainted"...

FRONTIER AIRLINES

LINKS SEVEN STATES OF THE ROCKY MOUNTAIN EMPIRE

. . . from Montana to Mexico. Direct air service to over 50 Rocky Mountain cities via America's most scenic skyway—*FRONTIER AIRLINES, America's largest local service airline.*

Prompt connections for continuing service to and from any part of the world with *all* transcontinental carriers. FRONTIER service features 24-passenger dependable DC-3 planes with reclining air foam seats, stewardesses on all flights, and snack service for through passengers.

FRONTIER AIRLINES
SERVING THE ROCKY MOUNTAIN EMPIRE

search purposes. While the information from these tests will be made available to the industry, the Allison program is still in its early stages.

CAA feels that Jan., 1952, would be an optimistic date at which the Convair Turboliner might be available for prototype testing. When and if the plane is made available, CAA estimates it would take about nine months to accumulate 200 hours required for type tests. Following completion of these tests the program calls for two additional aircraft of this type to be used in one year of simulated airline operation.

How It Would Work

Either the manufacturer or an airline interested in the project would presumably have to provide these aircraft since no funds are authorized for the procurement of test aircraft. During the simulated airline operation, airline personnel would fly the aircraft and manufacturer's representatives would follow up on engineering and maintenance activities.

The airline presumably would be picked on the basis of bids open to the industry. An attempt would be made to log about 1,600 flying hours on each aircraft during the tests. This would be followed by a three-month period of modification to bring the aircraft up to requirements established by service tests.

If the aircraft were made available, July 1 would see the start of CAA type tests on the B-45, the Chase C-122 and the helicopter. The B-45 has consistently been looked on as a promising jet bomber for tests because it is available in operational use and yet it is not one of the newest aircraft used by the USAF. While well suited to the test program it would not detract greatly from military operations.

The Chase C-122, while new, is not the latest airplane in this series. Yet the Chase C-122 does have the high wing design and truck level loading platform specified by cargo operators as so critical. It also uses the Wright 1820 engine which the feeder type airlines have expressed interest in as the power-plant for their operation.

25% on Helicopters

About 75% of the $2 million would be spent on tests of the three aircraft types, and about 25% on the helicopters. Test periods would be of different duration for each type. The C-122 would take about 15 months of simulated airline operation, the helicopters would be operated for about a year to gain some 1,200 hours' experience, the Turboliner about one year for 1,600 hours on each plane and the three B-45's would log about 400 hours per year for two years for a total of 2,400 hours.

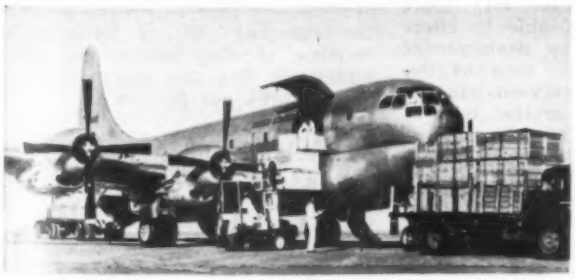
The current program would not limit the participation of other aircraft.

The "Big Hurry!"

It's a flying "gas station"! *With Boeing-designed boom, KC-97 refuels a Boeing B-50 Superfortress bomber in midair.*

...and a hospital ship! *Shown unloading wounded here, a MATS operated Stratofreighter can carry up to 107 casualties.*

...and a flying command post! *Stratofreighter serves as highly mobile, self-contained headquarters for Strategic Air Command.*



...and a heavy cargo carrier! *Stratofreighter can be loaded with 34 tons of freight from four trucks simultaneously.*

...and a fast troop carrier! *C-97 can transport 131 fully equipped combat troops with weapons anywhere they're needed.*

For the U. S. Air Force, the C-97 Boeing Stratofreighter carries almost anything, anywhere—fast!

This 14,000-horsepower teammate of the B-50, with twice the volume of a standard boxcar, is fast, powerful, versatile. It set records for capacity and utility during the Berlin airlift. It is setting new speed and performance records over the Pacific in hospital ship duty and in transporting personnel and equipment. And now a new role — as flying tanker for aerial refueling of combat bombers — is revealed in the KC-97 version of the Stratofreighter. Conversion from tanker to transport — or the reverse — can be made in less than 24 hours.

With all three of its spacious cargo holds completely air and altitude conditioned, there is scarcely a limit to what the 375-mile-an-hour, twin-deck Stratofreighter can carry. And it can be loaded and unloaded quickly by virtue of self-contained ramps and hoists and specially designed cargo doors.

Designed by Boeing in co-operation with the Air Force, new-type C-97 Stratofreighters are now in quantity production. They will prove of inestimable value in America's defense program.

Mechanical, electrical, aeronautical, civil engineers and physicists! Boeing has exceptional openings for you! Write Engineering Personnel, Boeing Airplane Company, Seattle 14, Washington.

BOEING

STRATOFREIGHTER

WANTED . . .

A Local Service Airplane!

By TOM H. DAVIS
President, Piedmont Airlines

"Fifty-two per cent of the air passengers of today travel less than 400 miles! Forty-five per cent of these travel less than 200 miles. Yet there is not in existence a modern certificated transport aircraft designed for efficient operation for flight distances of less than 400 miles."

IT IS an obvious fact that we do not now have available a truly efficient short-haul aircraft, utilizing to the fullest extent possible all of the presently available know-how and newest proven materials.

The closest thing to it, of course, is the DC-3, and who is to say that an airplane designed over 15 years ago is modern. The aeronautical engineering profession has long since put whiskers and gray hair on the DC-3 in terms of know-how. But our problem today is in assembling all of this know-how into one unit, one airplane, designed for this specific purpose.

The end result must be an aircraft that will break even at a 50 per cent load factor or less and operate at a very minimum per *plane* mile cost.

I should also like to emphasize the fact that this new airplane is needed *now*—not five or ten years from now—and the specifications we shall outline involve no Buck Rogers thinking. The job can be done now.

Cost Biggest Problem

Does it surprise you to learn that in 1949 over 43%, almost half, of the total miles flown by all domestic airlines was flown with *pre-war* equipment? That is a situation that must change, and change quickly, if air transport is to continue to grow.

Perhaps the greatest problem with which we are confronted is the matter of operating costs, including depreciation.

Did you realize that 10 years ago the operating cost of the DC-3 in scheduled operations was from 50c to 60c per mile—even in so-called local service operation? Thus, at that time, we had an airplane that would break even with a 50% load factor. Today most trunk-line operators claim it costs them one dollar or more per mile to operate a DC-3.

Today the local service carriers and the trunk-lines alike are paying wages more than double what they were 10 years ago. They are paying almost double what they used to pay for fuel—one of the biggest single items of cost. They are paying double and triple what they used to pay for parts and most materials. They are paying higher landing fees and rentals, whereas landing privileges were free in many instances 10 or 12 years ago. The only thing that hasn't gone up is the passenger fare.

Amazing Economies

The local service lines, in spite of the high costs involved in serving many communities over very short distances, have been able to effect amazing economies by development of many innovations, such as the integral step-door, carry-on baggage compartments, short ground time at intermediate points, et cetera. Most trunk-lines did not attain load factors of as much as 35-40% until the beginning of World War II. And so it has been with the local service lines.

It has and will take time to fully develop the traffic to and from the smaller communities. Therefore, a wide gap has existed between non-mail revenue and total costs for these new airlines. The gap has narrowed with encouraging rapidity. The next step is to completely eliminate the gap.

The airlines providing short haul air service, whether they are so-called trunk lines or local service lines, cannot go back to paying the wages and prices prevailing ten years ago. That, of course, is out of the question. What is the answer? The only practical solution is through the employment of a new airplane.

With that in mind, let us consider first of all some general principles, and secondly the basic specifications of this sorely needed aircraft.

It seems to me that we should all be alarmed over the fact that we are today building our aircraft in basically the same manner they were built 15 or 20 years ago. Two decades ago we learned to use sheet metal riveted together to form our wing sections and our monocoque fuselage sections. Today we are *still* using sheet metal riveted together. As you know, during the last war our aircraft were commonly referred to as a bucket of bolts. And that remains about the situation today. Are we forever going to be ham-strung by constantly patching up the fatigue cracks that inevitably show up on every inspection?

Why don't engineers come out with something that will eliminate this tedious handwork and push for a development that will make possible the stamping out, or forming, or molding, of wing sections and other assemblies like the automobile industry turns out fenders.

Molded Sub-Assemblies

With the tremendous amount of experience and know-how that we have with plastics is it unreasonable to expect the development of some material that could be molded into sub-assemblies with complete success? I think not. Maybe it should be done on a piece-meal basis, by starting out with such items as wing tips—a highly replaceable item because of ground damage; and fairings or fillets, landing gear doors, nose sections, leading edges; or any other place, just to get the ball rolling.

The tentative specifications outlined here represent a consolidation of the ideas and desires of most of the presently certificated local service carriers. Questionnaires have been distributed by the Air Transport Association, and many meetings have been held in order to come up with performance and design specifications which will meet the requirements

NOTE: The above article formed the basis for a paper for delivery by Mr. Davis at the Society of Automotive Engineers aeronautic meeting in New York, N. Y., April 17.

of the industry. Of course, there are always exceptions. Consequently, these general specifications represent some compromises in that practically all of the local service operators are agreed that this is the airplane we need. The requirements and specifications discussed here are not necessarily in order of importance.

Payload

The aircraft must have a normal (not high density) capacity of 24 passengers at 200 pounds per passenger, including baggage. In addition, it must have a cargo capacity of at least 1,700 pounds, and the usable cargo volume shall be based upon cargo density of eight pounds per cubic foot.

Every time I mention a 24-passenger airplane to people they say one of two things. It's either "Why so much capacity when the average load of all local service airlines today is less than 10 passengers?"—or it's "Why not go ahead and take the new 40-passenger aircraft that are presently available for just slightly more than it will cost to get a 24-passenger aircraft?" Both are good questions.

There are several reasons in both instances. We can never expect a constant 100% load factor in any size airplane, even though it may carry only 10 passengers—or even a 75% load factor, if we expect to give good service. It is common knowledge that when an airline consistently operates at a load factor greater than 75% most of the time they are turning away customers.

We always have peak days, especially over the week ends and holidays. That's where we get the gravy—and if we don't have the capacity to take care of it we are out of luck.

Break-even at 50%

As pointed out previously, this airplane must be able to break even from a cost standpoint with a 50% load factor. At 6c per passenger mile I think it would be asking a little bit too much of engineers to give us an airplane that would operate at a total cost of 30c per plane mile—or the equivalent of a 50% load factor in a 10 passenger aircraft. On the other hand, I think that a total cost of 66c per plane mile is easily obtainable for a 24-passenger airplane. This would be an average load of 11 passengers, or slightly less than a 50% load factor.

Too, we are always confronted with the fact that it takes at least two pilots, regardless of whether its a 10-place aircraft of a 24-place aircraft. There are other similar fixed costs which make it inadvisable to consider an aircraft of much less than 24-passenger capacity.

On the other side of the fence, there are also several answers to the question as to why not use the pres-

U. S. REPRESENTATIVES
ALITALIA
AEROLINEE
ITALIANE INTERNAZIONALI
ROME, ITALY

SOLE AGENTS FOR
U. S. AND CANADA
RUDGE WHITWORTH
LICENSEE

YOU SHOULD
CONSIDER OUR SERVICES . . .
because WE OFFER . . .

- ☆ 25 years of aeronautical engineering experience
- ☆ 25 years in aviation export business
- ☆ Every staff member an aviation and export specialist
- ☆ Complete coverage of foreign and domestic markets
- ☆ Thorough knowledge of civil and military equipment

CONSULTANTS • SALES REPRESENTATIVES
BUYERS IN AVIATION

A. E. ULMANN & ASSOCIATES, LTD.
342 MADISON AVENUE
NEW YORK 17, N. Y. TELEPHONE: MURRAY HILL 7-8790
CABLE ADDRESS: "AIRULMANN"—NEW YORK

WASHINGTON, D. C. 217 DU PONT CIRCLE BUILDING
TELEPHONE: MICHIGAN 5227

2 in 1

ENGINE PARTS

Today, as in years past, leading airlines of the world continue to depend on AE&P for engine parts, overhaul tools and all types of aeronautical equipment. AE&P provides swift delivery out of the largest, wholly-owned inventory of its kind in the world.

ENGINE OVERHAUL

American Air Service, at Charlotte, N.C., operates the South Atlantic's leading engine overhaul shops. Now an affiliate of AE&P, American Air Service offers genuine and positive economies in the form of maximum engine efficiency, plus greater operational time between engine changes. These are the result of superior engine overhaul.

CAA Approved Shops No. 3613

...STEADY GROWTH ASSURES DEPENDABLE SERVICE.

AEP

AIRCRAFT ENGINE AND PARTS CORPORATION

General and Executive Offices:
345 Madison Ave., New York 17, N. Y.
Washington Grantham, Pa. Paris
Cable Address: AIRPARTS, NEW YORK
U. S. Export Registration No. 2422

ently available 40-passenger aircraft.

The secret of success of a local service airline, from the standpoint of the traveling public as well as the operator, lies in high frequency of schedules. We find in our operation that, in most cases, when additional schedules are put on reasonably good route segments, load factors on all flights go up immediately. It seems to me it will be several years, however, before there is enough volume over most local service routes to justify the great amount of capacity that would be made available by an adequate frequency of schedules using 40-passenger equipment. We would be hauling around all that dead weight at substantially higher costs.

As you know, there seems to have developed a definite breaking point. When you begin thinking in terms of an aircraft having a gross weight of more than 30,000 pounds there is no choice but to go to the bigger engines in the 2000 horsepower class. This brings about multitudinous allied increases in strength requirements, replacement parts costs, maintenance equipment, etc.

Another factor dictating against the use of these larger aircraft in local service operation is the matter of runway length requirement, which will be discussed later.

Operating Costs

As a result of the survey of the local service operators previously referred to, it was the general thinking that the direct operating cost per *plane* mile should not exceed 35c, including depreciation, based on an average trip length of 65 miles. Earlier I pointed out that the presently available modern aircraft, the Convair 240 and the Martin 404, do not reach the optimum in operating efficiency in terms of cost per plane mile except when operated in stage length of 400 miles or more. For stage or trip lengths of less than 400 miles the cost curve goes up sharply, and by the time it reaches the 100 mile trip length point the cost is completely out of reason for local service operation.

When computed on a *per seat mile* basis it is true the operating cost of these larger aircraft appears very favorable. Nevertheless, when considering reasonably obtainable load factors over most local service routes having proper schedule frequency, the *per plane mile* cost figure is the controlling one. It simply gets back to the fact that the cost of carrying around these additional un-needed seats increases the per *plane* mile cost to the point that attainable non-mail revenues will not in the foreseeable future offset per plane mile costs.

The direct cost per plane mile referred to as being appropriate for a new local service airplane, was not arrived at by just picking a figure out of thin air. It represents a direct cost figure which should not be exceeded for an aircraft that will break even at a 50% load factor. This is of utmost importance in my opinion.

We can appreciate that, from an engineering standpoint, it is almost impossible to develop today an aircraft that will break even at existing fare levels with five passengers—or in other words, a 10-place aircraft at 50% load factor, whereas 11 or 12 passengers should produce an operating profit in a 24-passenger aircraft.

Better Service Follows

Furthermore, I think it advisable that local operators increase their schedules as load factors begin exceeding 50% by any great extent. When that is done, naturally, more frequent and more useable service is made available to the public. Also the additional available capacity will help solve the problems of peak traffic days. Furthermore, costs and complications of reservations procedures are considerably reduced.

All in all, it boils down to the fact that a vast market of potential air travellers living in the smaller communities of our country will remain un-touched until we get an airplane that will break even on a fifty per cent load factor at existing fare levels.

It is generally true that the indirect costs of scheduled airlines are about equal to the direct costs. In other words, if this aircraft we are talking about will operate at a direct cost of 35c per *plane* mile, it could be expected that the total costs—direct and indirect—would be, at most, 70c per plane mile. For example, the indirect costs of the company with which I am associated were 33c per revenue plane mile last year. Adding that to the hoped-for 35c per plane mile direct costs would result in a total cost of 68c per plane mile. That figure is a good 10c per mile less than the per plane mile costs of the most efficient local service operators using DC-3 aircraft.

What Plane Would Save

To give you some idea of the importance of a saving of just $10 per mile in operating cost, let me give you this illustration. Based on the total mileage flown during 1950 by all local service airlines using DC-3 equipment the Federal government would have saved $3,454,456 if we had been using an aircraft meeting these specifications.

There is every indication that most of the local service operators will be averaging 10 to 12 revenue passengers per revenue mile within the next 12 months. Some are doing that now. At present fare levels of 6c per passenger mile, that is non-mail revenue of 60c to 72c per mile, which, you see, is right at the break-even point of

for more Summer Sales—

Delta "Millionaire" Vacations to MIAMI BEACH

Yes, we mean SUMMER. It's like this: an air-conditioned theatre is cozy at 72° in December and cool at 72° in August. Miami Beach has the same air-conditioning all year, too.

Miami Beach summer temperatures hover around 78-80°; the contrast to humid heat in Chicago or Detroit or New York is as pleasant in summer as is the escape from zero cold in winter.

Five years ago, Delta started selling this summer weather, offering packaged air vacations to Miami Beach. Vacationists like it so well that sales doubled each year. Formerly, most Miami hotels closed for the summer. Now, hotels have discovered a booming year-round business.

Vacation costs have been held at low levels of past years; all the millionaire facilities of Miami Beach are available at budget bargain rates.

3 Vacation Offers

1. **DELTA "MILLIONAIRE" CRUISES**
   Round trip by air, 8 days – 7 nights at ocean front hotel, breakfasts daily, use of private beaches and pools, sightseeing by boat and coach.
   Complete "Millionaire" Vacation Typical Cost: from Chicago $160.70

2. **DELTA "PLAN-YOUR-OWN" VACATIONS**
   Excursion rates of 25% off on round trips, permitting longer stays. Good to September 30, 1951, between Florida and Lexington, Cincinnati, Chicago, Detroit and other points north.

3. **CARIBBEAN SIDE TRIPS**
   Nassau, Havana and Jamaica—included in Delta "Millionaire" cruise if desired.

FREE BROCHURE

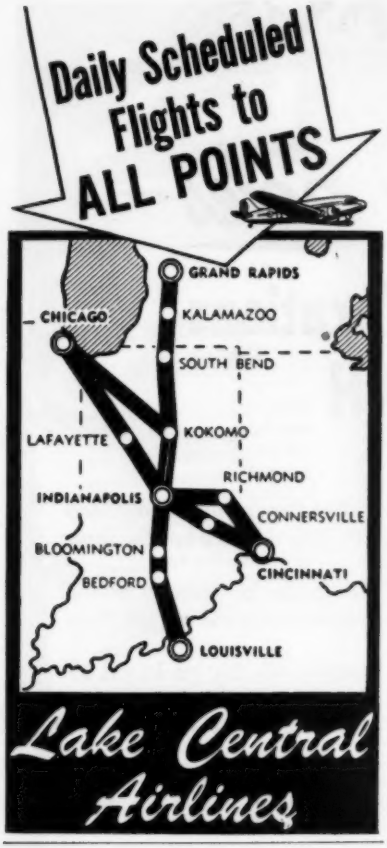
Get the newest, most colorful brochure describing Miami Beach vacations . . . thrilling new four-color photographs . . . Write or ask at any Delta office.

VIP *Puts Vacations to Work for You*

Ask for details of Delta's new Vacation Incentive Plan for all types of business firms. "Millionaire" vacation prizes spur sales efforts.

Delta AIR LINES

General Offices: Atlanta, Ga.



ALLISON
RADAR

NAVIGATIONAL AID
FOR MULTI-ENGINED
TRANSPORT AIRCRAFT
& HELICOPTERS

MILITARY—CIVIL

SMALL—COMPACT
LIGHTWEIGHT
EFFICIENT

SEES THRU FOG
DAY AND NIGHT

- Sees Thunderstorm Cores, Snow, Hail, Rain in advance.
- Promotes smoother flying for passenger safety and comfort.
- Warns of approaching aircraft in line of flight.
- Sees obstructions in true outline and/or direction.

ALLISON
RADAR CORPORATION
11 W. 42 St., N. Y. 18 PEnn 6-5811-12

this new aircraft we are talking about. After taking into consideration incidental revenues from freight, express, excess baggage, et cetera, it is obvious that we could soon conduct our operations completely without the aid of mail pay if we had this new airplane.

Range

The operating range of this new aircraft should be 350 miles with maximum pay load, including five intermediate stops with 200 miles plus forty-five minutes reserve at 60% METO power. Increased tankage of 40% over the 350-mile requirement should be provided so that additional range can be obtained with reduced payload.

Field Size

It is the thinking of most of the operators that this aircraft should be capable of operating from runways of 3,300 feet length at sea level, under standard atmospheric conditions, at full gross take-off weight. However, I should like to make these further observations.

A survey of the airports used by five representative short haul airlines indicates that less than 16% of these airports have runways shorter than 4,000 feet. That raises the question as to how much of a penalty in operating efficiency should we take in order to make available full gross take-off capacity at just 16% of our airports.

Under new CAA Transport Category Requirements, the difference in an airplane which must meet a 3,300 foot runway length requirement, versus one which would meet a 4,000 foot runway requirement, can be considerable. The difference between the runway lengths can result in lower cruising speeds in order to meet short runway requirements, which obviously means higher direct operating costs or more expensive lift devices, or any one of a number of other performance penalties.

Length vs. Costs

The engineer designing an aircraft to meet these requirements must, of course, take into full consideration the percentage of decrease in direct operating costs per mile in reaching this decision as to whether or not the runway length requirement will be at 3,300 feet or 4,000 feet. In my view, if the longer runway would not decrease costs by more than 5%, then we had best stick to the shorter runway requirement. All of the new carriers are certificated to serve points that do not now have adequate airports. Some of them, because of terrain difficulties simply can not build airports having 4,000 foot runways, even if they could afford to spend that much money. These cities need air service and the airlines could get a substantial amount of revenue by serving them.

Speed

This factor is directly related to the runway length problem, and no further detailed discussion is needed. What we want is the highest speed possible, consistent with economy of operation. Speed should not be obtained by undue sacrifice of economy, taking all factors into consideration. It would be my feeling that we could reasonably expect a cruising speed of at least 200 mph at 4,000 feet above sea level using 50% power.

Power Plants

Here is an opportunity for us to take advantage of the tremendous progress accruing in this field in the last 15 years.

Most operators feel that conventional reciprocating engines should be used for two reasons. One is that the project would be expedited considerably by agreeing to use conventional engines. The other reason given is their concern over mechanical difficulties which they felt would be encountered by departing from conventional engines. I submit that both of these are very real problems.

However, I am going to suggest very strongly that any aircraft to be constructed for the purpose of local service operation be equipped with turbo-propeller engines. To me as a layman there is every indication that the turboprop engine will be equally as reliable as the reciprocating engine by the time any newly developed aircraft is ready for production.

One of the obvious and most important advantages of the turboprop engine is the enormous weight saving to be realized. It is my understanding that the Mamba turbo-propeller engine develops more than two horsepower per pound of engine weight. In contrast the conventional Wright 1820-C9HE develops one horsepower per pound of weight. A 100% improvement in the horsepower per pound of weight ratio is something to consider carefully.

Ground Handling

Because of the multitude of intermediate points in close proximity along the routes of local service carriers, it is imperative that time at the ramp be kept at the absolute minimum.

It is imperative that all cargo space be supplied above floor level and the cargo compartment should be immediately adjacent to the passenger cabin so that flight attendants can conveniently supervise the loading of both sections of the airplane. The cargo compartment should be directly accessible from the passenger cabin. The loading and unloading of cargo must be accomplished from

ground level without the aid of lifts or ladders. Cargo pits should be so arranged that the direct loading and unloading can be accomplished at waist height from outside the airplane. The cargo door opening should be at floor level.

Simplified weight and balance operation is of extreme importance. Consequently, this should be the primary consideration in determining passenger seating arrangement. With this in mind either three or four abreast would be acceptable. Seat spacing should be such that comfort is comparable to the standard three abreast DC-3 installation.

Arrangements should also be made for carry-on storage of passenger baggage.

This is an area where we must have vastly more advancement. Gone are the days when we can be content in spending 20 hours working on an aircraft of this size for every one hour it is in the air.

Proper engineering can reduce this ratio by at least 50% and perhaps more. This problem is costly not only from the direct man-hour standpoint, but it also means that much of the time equipment is tied up in the shop. Therefore, utilization is limited, and utilization of equipment is the key to profitable airline operation.

Excessive Engine Changes

One shining example of improper design from the maintenance standpoint in pre-war aircraft is the excessive amount of time required for engine changes. In our company this requires approximately 15 man hours on our DC-3's. This operation should be done in a maximum of four man hours on any properly designed new aircraft of this size.

At practically every periodic inspection we find it necessary to make repairs to cracked rib clips. It is very difficult to get at these parts to make repairs for lack of adequate inspection openings. Also, a tremendous amount of time is wasted on rigging engine controls, flaps, ailerons, and elevators. Let's make it simple so it won't require a highly skilled specialist to perform these functions. Little things like doors, locks, hinges, and latches are constantly giving trouble.

Parts and accessories should be simple and inter-changeable. A major air frame overhaul and inspection should require not more than 2,000 man hours instead of 5,000 man hours.

Of course, the aircraft must comply with T-Category Requirements under Part 4B of the Civil Air Regulations. However, if in the judgment of the engineer there are some parts of 4B that unduly penalize an aircraft designed specifically for short-haul operation then there should be no hesitancy in requesting amendments to the applicable regulation.

I'D RATHER FLY

Hawaiian

Next Trip to Honolulu
Fly Hawaiian to the Neighbor Islands - Kauai, Maui, Molokai, Lanai, Hawaii. For complete information, write:

Fort & Merchant Sts.
Honolulu, USA
Hawaii's Oldest Airline

HAWAIIAN AIRLINES
21 years of safe, dependable flying.

to see beyond
TOMORROW'S HEADLINES

American Aviation DAILY . . . created for the key men in aviation who must have all the latest news first. Every Airline and Aircraft Manufacturing Company in the United States relies on American Aviation DAILY for expert reporting and skilled analysis vital to them in seeing beyond tomorrow's headlines.

Here is the ultimate in aviation reporting . . . up to the minute news as it happens . . . edited and evaluated by specialists . . . . air mailed to your desk every week day.

American Aviation DAILY is as necessary to you as the latest aviation news. For information and sample copies write:

American Aviation DAILY
1025 Vermont Avenue, N. W.
Washington 5, D. C.

"Minute men of the air." Their quick switch from flying the international trade routes to flying men and weapons wherever needed, rightly earns for 1951 civilian flight crews the title, "Minute men of the air." They back up *today's* defenders of freedom.

NOW ON DUTY

in the Pan American Airlift Group

AMERICAN AIRLINES — WESTERN AIRLINES
CAPITAL AIRLINES — PANAGRA
PAN AMERICAN WORLD AIRWAYS

Every scheduled airline is in flight-line readiness to pitch in the moment its help is wanted. Military transport needs are flexible and the above airlines are outstanding examples of how commercial aviation *backs up* the Military Air Transport Service. *Let no one forget:* whenever our nation's security requires them, the scheduled airlines are ready to fill their role as America's "Second Line of Defense."

PAN AMERICAN

AMERICAN AVIATION

Their quick switch from plows to guns earned America's early defenders of freedom the nickname, "Minute Men."

MINUTE MEN— 1951 VERSION!

—The spirit of 1776 dead? Not so you could notice it! To spring to freedom's defense took America but a minute then—takes but a minute now!

Proof? *Think of Korea. As soon as the emergency call came, a Pan American Clipper* was en route to Korea . . . answering freedom's need for immediate air transportation of men and the materiel of war.*

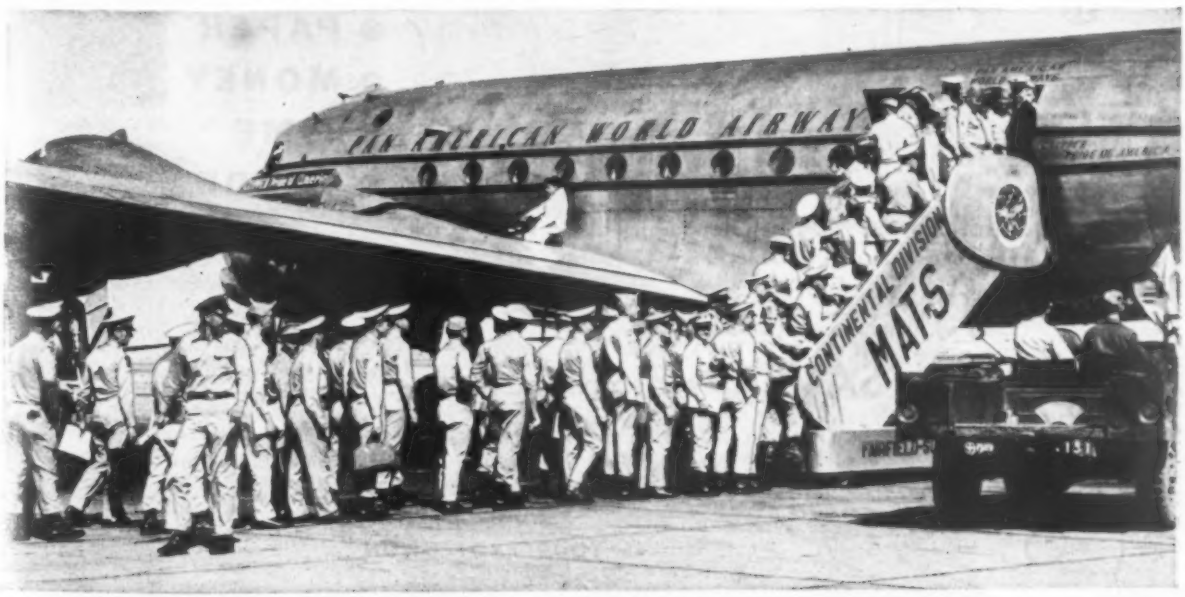
Teamwork . . . American style. That immediate response to emergency was made possible by teamwork and foresight. Top men in government, the Military Air Transport Service, aircraft manufacturers and the great airline operators . . . worked together *American-style* to make civilian air transport America's "Second Line of Defense."

That's why, even in the midst of peacetime operations, the civilian airlines are always mobilized . . . ready for overseas service *at a moment's notice.*

Airline Experience becomes Military Asset. Pan American's 23 years of overseas experience qualified it, for instance, to become the largest prime contractor to the military in the Korean airlift. Trained flight and ground personnel, from other airlines, manning their own equipment, were ready at a moment's notice to join the airlift, operating under Pan American direction.

Pan American is grateful that under our country's system of free enterprise, it is able to contribute so promptly so much of what is needed, when *it's needed.*

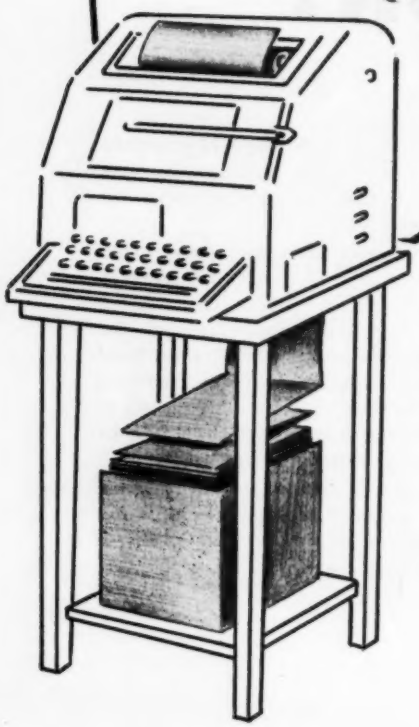
*Trade Mark, Reg. U.S. Pat. Off.



"Striking power." Military leaders depend on air transport to give them speed, maneuverability and concentrated striking power. The civilian airlines provide a tremendous reserve of such emergency transportation.

WORLD'S MOST EXPERIENCED AIRLINE

If your company uses Teletypewriter printer paper, this message is important to you!



PERFECTION FOLDED

TELETYPEWRITER PRINTER PAPER

Will Save you

- PAPER
- MONEY
- TIME
- LABOR

...and here's why:

PERFECTION FOLDED is ALL usable paper. No leftover cores or unused paper at either end of roll.

PERFECTION FOLDED eliminates message interruptions due to roll changes; requires less storage space.

PERFECTION FOLDED saves attendant's time by eliminating frequent checking. There is no curl as in roll stock.

SAVE—with **PERFECTION FOLDED**

Perfection *The World's Leading Brand of Communication Papers*

IS YOUR PROTECTION

PAPER MANUFACTURERS COMPANY

PHILADELPHIA 23 PENNSYLVANIA

Branches: Atlanta • Chicago • New York • Cleveland • Los Angeles • San Francisco

Pacific Coast Warehouses: Los Angeles • San Francisco

THESE MEN SHAPE *Air Policy*

By GERARD B. DOBBEN

MILITARY aviation looms large in the government's multi-billion dollar mobilization program today. Hence it is natural that many of aviation's current leaders in Congress are those who are primarily concerned with making America strong in the air.

While the emphasis is on building up the fighting strength of the military air arms, civil aviation, too, has won new recognition both in and outside of Congress of the role it will be called upon to play in the case of all-out war. Thus the leaders of civil aviation activities in Congress are only slightly less important in the overall mobilization effort.

Progress in civil aviation was advanced many years by the technological developments in all types of aircraft and operations in World War II and there is no reason to believe that civil aviation will not benefit from the great resurgence in building up the country's military air strength today.

The 10 legislators whose pictures appear here have been selected for their importance to military and civil aviation based on their position, influence and knowledge of the subject. Industry leaders both in and outside of the government have generally concurred in these selections.

Here's why these members of Congress are important to aviation.

• **Rep. Carl Vinson** (D., Ga.) is chairman of the House Armed Services Committee. In the light of today's mobilization program, Vinson is one of the outstanding leaders in Congress on military matters, including military aviation. A strong supporter of air power, Vinson nevertheless has an overall grasp of the need for balance between the various components of the military establishment. A part of Vinson's power today stems from the fact that his committee will be investigating how the mobilization dollar is being spent and what it is buying.

• **Sen. Richard Russell** (D., Ga.) is chairman of the Senate Armed Services Committee. Like his fellow Georgian, Vinson, Russell is the key man in the Senate on all military legislation. Russell was elevated to the chairmanship of the Armed Services committee this year following the defeat of Sen. Millard Tydings (D., Md.) after serving on the committee since it was established after passage of the unification act. He is an ardent supporter of U. S. air power but conservative on matters of foreign military aid.

• **Rep. George H. Mahon** (D., Texas) is chairman of the Armed Services subcommittee of the House Appropriations Committee and as such holds the key position with reference to appropriations for military aviation. Mahon was a leader in the fight for a 70-group Air Force and his subcommittee handled the multi-billion-dollar mobilization appropriation bills last year, and is conducting the hearings on them again this year.

• **Sen. Edwin C. Johnson** (D., Colo.) is chairman of the Senate Interstate and Foreign Commerce Committee which handles all legislation pertaining to civil aviation and all other forms of transportation. Because of studies undertaken by the Commerce Committee of problems involved in the separation of mail pay from subsidies, Johnson probably will ultimately author the legislation which will accomplish separation. In addition he is a strong proponent of prototype aircraft legislation which may receive further consideration by Congress this year.

• **Sen. Pat McCarran** (D., Nev.) is chairman of the State, Justice, Commerce and Judiciary subcommittee of the Senate Appropriations Committee and largely responsible for appropriations which affect the civil aviation agencies of government, primarily CAB and CAA. Regarded as the author of the Civil Aeronautics Act of 1938, McCarran successfully sponsors many aviation bills through each Congress.

• **Rep. Carl Hinshaw** (R., Calif.), second ranking Republican on the House Interstate and Foreign Commerce Committee, continues to be one of the best-informed members of both House and Senate on both civil and military aviation matters. Hinshaw led the fight in Congress to standardize the air navigational aviation program which is being implemented through the work of the Air Naviga-

WHY DO SO MANY PEOPLE SAY...

SEND IT TO

Airwork

More and more, airline officials and owners of executive aircraft are saying, "Send it to Airwork". Here's why:

Month after month, the newly overhauled Pratt and Whitney engines and accessories from our production lines are setting records for dependability, extra performance, more economical operation and longer life between overhauls . . . *You* will profit by saying, "Send it to Airwork".

Airwork Corporation also distributes the following aviation products: Bendix, BG, Champion, Continental, Jack & Heintz, Packard Cable, Pesco, Pratt & Whitney, Romec Pumps, Thompson Products, Titeflex, and U.S. Rubber.

ONE OF THE FOUR

PRATT & WHITNEY DISTRIBUTORS

Airwork
CORPORATION
MILLVILLE, NEW JERSEY

tion Development Board. As an engineer, Hinshaw brings a lot of knowledge to the committee's deliberations on technical matters.

• **Rep. John J. Rooney** (D., N. Y.) is chairman of the State, Justice, Commerce and Judiciary subcommittee of the House Appropriations Committee. A severe critic of CAB, Rooney and his subcommittee have forced CAB to adopt more efficient techniques and they are constantly goading the Board to cut down its backlog of route and rate cases.

• **Rep. Karl Stefan** (R., Neb.) is the ranking Republican member on the State, Justice, Commerce and Judiciary subcommittee of the House Appropriations Committee and long a supporter of long-range plans for the development of civil aviation. He has a deep interest in private aviation and is a friend of the private pilot.

• **Rep. Robert Crosser** (D., Ohio) is chairman of the House Interstate and Foreign Commerce Committee and a strong supporter of labor policies deemed to benefit the airline pilot and the airline mechanic. Rep. Crosser led the fight to get the union shop in the airline industry. Also he is spearheading efforts to get legislation passed which would recreate the Independent Air Safety Board—a must with commercial airline pilots.

• **Sen. Owen Brewster** (R., Me.) second ranking Republican member of the Senate Interstate and Foreign Commerce Committee and a member of the Senate Finance Committee, continues as a strong influence in the Senate on matters affecting aviation. Brewster has been a leader in the effort to get prototype legislation for the design and development of jet transports because he believes this country is far behind the British.

Everyone is Looking to LATIN AMERICA

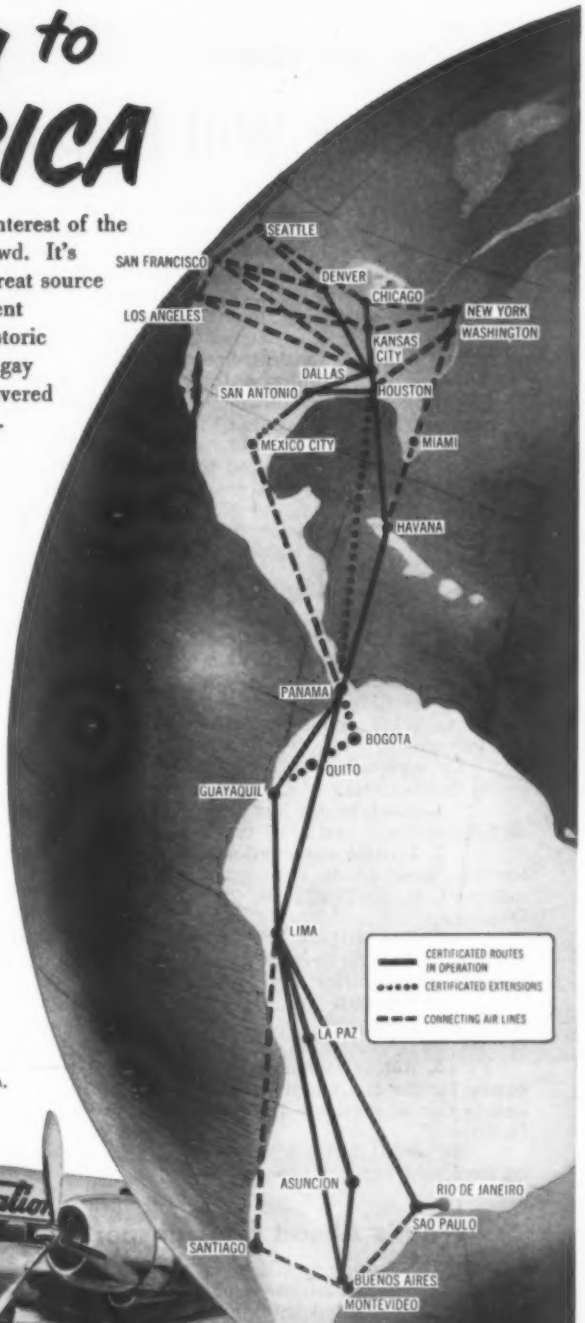
With magnetic attraction Latin America has seized the interest of the Who's Who in commerce and the smart-set vacation crowd. It's today's land of business opportunity—a vast market—a great source of supply. It's today's greatest playland, too, where ancient civilizations rub elbows with the ultra-modern, where historic landmarks contrast with elegant hotels, smart shops and gay casinos. Now, as never before, those in the know have discovered there's business to be done, there's more pleasure and fun—in Latin America. Yes, all eyes are on Latin America.

and BRANIFF

—the U.S. airline that has set new standards of travel luxury, of travel economy to all Latin America. Those who demand the utmost in comfort and service choose Braniff's famous *"El Conquistador"*, a 300 mile-an-hour DC-6 with luxury lounges by day, bed size berths by night, plus gourmet meals, cocktails, hors d'oeuvre, afternoon tea — all the trimmings. The budget-minded select Braniff's *"El Intercontinental"*— no berths, no cocktails, but solid comfort, full-reclining seats in a 250 mile-an-hour four-engine Douglas Skyliner—and at 25% below regular fares. Twenty-two years of "know how" insure your comfort, safety and satisfaction when you fly Braniff. For your trip to Latin America have your Travel Agent route you via Braniff.

Ω OMEGA—Official Braniff Timepiece

©1951, B.I.A.



Braniff International Airways • Offices in Principal Cities Throughout the Western Hemisphere

IF ALL-OUT WAR COMES . . .

What Will Happen to the Airlines?

THE ROLE of the United States airlines in the national defense effort is now being decided. Right now the National Security Resources Board is reviewing the recommendations of industry experts on every phase of airline operations. From these reports will grow the mobilization plan. It will strive to marry the needs of the civil economy with the reality of military requirements.

There is no question that the current day concept of competitive airline operation will virtually disappear in the event of a stepped-up mobilization or all-out war. Much of the four-engine equipment will be transferred to the military services along with flight and ground crews, some of the remaining four-engine and even twin-engine equipment will be redistributed and service to many cities will be sharply curtailed or completely discontinued.

The airlines won't like it. Recognizing the need for such drastic action, and recognizing the leadership of a well-informed and sympathetic mobilization chief, the airlines may accept such a plan gracefully. If not, the mobilizer, Under Secretary of Commerce Delos W. Rentzel, has the power to bring about these changes without airline consent.

By executive order President Truman has given the Secretary of Commerce the authority to:

1. Analyze the air transport requirements of both military and civil users.

2. Initiate such action as may be required to meet these needs, including the transfer or assignment of civil aircraft to the Department of Defense.

3. Redistribute remaining civil aircraft among all air carriers to assure maintenance of essential civil routes and services.

4. Schedule the movement of traffic and administer priorities for the transportation of passengers, cargo and mail by civil air carriers.

5. Act as claimant for materials and manpower for the construction, operation, maintenance, and repair of civil air transportation systems and facilities.

No final decision on how this power will be exercised has yet been reached.

What's Ahead for Transports

THE FIRST thing to affect the airlines will probably be the modification of aircraft. Civil aircraft will be divided into three basic groups.

Four-engine equipment will be grouped as (1) equipment which would automatically be called up on M-Day to meet known requirements, (2) equipment to be called up at a later date as the mobilization speed-up dictated, and (3) those planes which would necessarily be retained in civil operations to meet essential air travel requirements.

As currently visualized no twin-engine equipment would be mobilized.

On M-Day the military services want to know that virtually overnight they will have the first group of civil aircraft ready for immediate use.

This will require modification of virtually all domestic four-engine civil aircraft to include: (1) long range communications and navigation equipment, (2) fuel tankage upped as required on planes not so equipped, (3) floors equipped to permit over-night installation of cargo flooring, and (4) provisions for easy transition to high density seating.

This program will start almost immediately—as soon as it is determined who will pay the bill. The equipment must be purchased, the planes modified. Then the airlines will be carrying added weight which will detract from the payload. The U. S. government will pick up the tab but just how this will be done is still unknown. It may be in direct payments, perhaps in mail pay. The modification program will be handled to coincide with regular maintenance activities over a period of months.

Once these first planes are removed from the civil transport scene there will be a shortage of aircraft. Airlines operating four-engine equipment on short routes will be the first to lose out.

A study of the U. S. airline route structure has already been completed. The planners have a complete picture of what traffic is moving where and for what reason. The fact that some areas generate a sizeable amount of non-business traffic does not mean they will continue to receive high frequency service. Industrial cities should and will get first priority, many other cities with good ground transportation connections will be eliminated from the war air service pattern.

Plane utilization will have to be increased to provide the maximum air service possible. This means that there will be many midnight to dawn flights, flights during the hours that are now universally avoided except in limited air coach operations. Needless to say high density seating will be the rule in most cases.

Higher plane utilization is going to call for more manpower, both in flight and on the ground, and for more maintenance equipment and parts.

Can Manpower Be Held?

MANPOWER is another thing. It is certain that the drafting of the first group of civil aircraft will be accompanied by the loss of both ground and flight crews. These crews will be earmarked, name by name, soon after the program starts. When the call for equipment comes these civilians will be placed in much the same capacity as the men in the Air Transport Command during the last war.

Unlike the Pacific airlift, where the civil contract crewmen do not get near unfriendly territory, pilots and groundmen in this operation may be exposed to the dangers of war. This means they will have to wear a uniform of some type and an arrangement such as that used with the ATC now seems highly likely.

There will be a determined effort to keep trained personnel in their airline jobs. Where this is not possible, the existence of a set plan showing the degree to which each airline's operation will be disrupted should permit them to establish training and recruiting programs suited to the needs. Because the airlines cannot expect preferential treatment, manpower decisions affecting all phases of American industry will determine the true scope of the personnel problem.

READY HERE!

Last year more than 1,600,000 passengers chose flying as the way to travel and TWA as the way to fly. TWA's huge fleet of Skyliners flew 62,000,000 miles along its 32,000 miles of routes stretching from San Francisco to Bombay. Records like these, and many more, are ample proof of TWA's ability to provide an important part of the air transport element our armed forces might need in a sudden crisis. And TWA is always ready to do its share, just as it did in World War II and, more recently, in the Pacific Airlift.

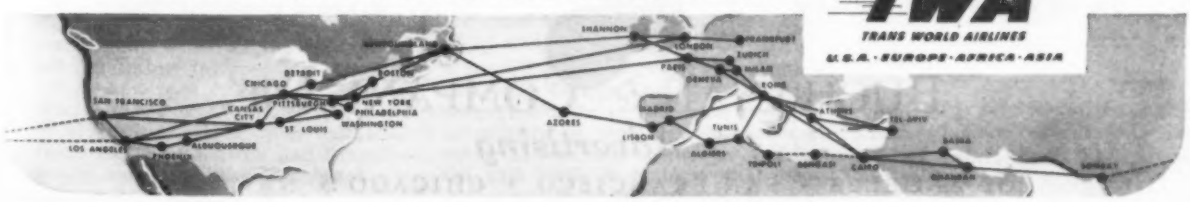
Where in the world do you want to go? For information and reservations, call TWA or see your travel agent.

ACROSS THE U.S. AND OVERSEAS... YOU CAN DEPEND ON

TWA

TRANS WORLD AIRLINES

U.S.A. · EUROPE · AFRICA · ASIA



Telling the WESTERN AIR LINES Story

America's Oldest Airline Celebrates Its 25th Anniversary

ON APRIL 17, 1926, a postoffice truck rumbled across Vail Field in Los Angeles and drew up beside a little fabric-covered biplane. The driver got out and began to pile mail sacks in the forward cockpit. One of the sacks held a letter from George E. Cryer, mayor of Los Angeles, to Mayor Jimmy Walker of New York.

Presently the pilot, wearing helmet with goggles and warm leather jacket, sauntered over to give the plane a careful, last-minute check. Satisfied, he clambered into the rear cockpit and signaled the mechanic to spin the prop. The Liberty engine burst into a roar, and the pilot taxied out for his takeoff.

And thus began a new chapter in the history of commercial aviation. For this was the first airmail out of Los Angeles—and it was carried by Western Air Lines.

Meanwhile, another Western plane had taken off from Salt Lake City, carrying the first airmail into Los Angeles. Somewhere over Nevada, the two pilots passed.

Western Air Lines has been in continuous operation since that day, and thus is America's Oldest Airline.

★ ★ ★

During the twenty-five years that followed, Western pioneered the skyways of the West—was first to introduce scientific weather forecasting and modern two-way radio systems, first to achieve a 10-year perfect-safety record, first to offer low-cost air coach travel on the Pacific Coast. And Western's system has grown, until today it flies a 5000-mile route, serving 45 cities in 13 western states and Canada.

★ ★ ★

Buchanan & Company has been Western's advertising agency since December, 1947.

Telling the Western Air Lines story has been an exciting job. It has been a story of constantly improving service...of faster flights and better schedules on Western's deluxe Convairs... of lower fares on Western's big Coachmasters.

And we've had the satisfaction of watching Western's passenger traffic grow and grow, until it made an all-time record in 1950, after outstripping all other major airlines in its rate of growth over 1949.

BUCHANAN & COMPANY, INC.
Advertising
LOS ANGELES • SAN FRANCISCO • CHICAGO • NEW YORK

1950 Best Earning Year for Airlines

Record Operating Incomes:

- *Domestic trunklines* $60,000,000
- *International lines* $19,000,000
- *Local service lines* ..... $ 667,000
- *TOTAL (before income taxes)* $79,667,000

By GOTCH & CRAWFORD
Planning Consultants

THE U. S. certificated air transport industry—domestic trunk, local service and international—showed a record net operating income of $80 million in 1950 on $800 million operating revenues, a jump of 80% over the $44 million net income reported in 1949.

More than $600 million were realized in passenger revenues, with about 75% of the total accounted for domestically. During 1950, the industry also for the first time topped the 10 billion mark in total revenue passenger-miles flown.

Probably the most striking development in the domestic trunk field in 1950 was the fact that the carriers netted $15 million in operating income *before mail pay*, the first peacetime year that this has been accomplished.

For the overall industry, the significant developments of the year were increased volumes of air service to the public at lower average prices, a refreshing departure from the trend of general price levels, while the airline industry for its part made a record net income.

DOMESTIC TRUNKS

NET OPERATING income of the domestic trunkline carriers (including three territorial airlines) reached an all time record of $60 million in 1950. This represented two and a half times the net operating income reported for 1949. All of the improvement in income was attributable to increases in commercial revenues, with mail revenues being actually somewhat less than in 1949. Total revenues increased $60 million of which $50 million were increased passenger revenues.

American Airlines accounted for more than a third of the $60 million net operating income, and the Big Four—American, Eastern, Trans-World and United—totaled in excess of $53 million. Four other carriers—National, Capital, Delta and Braniff—netted more than $2 million each.

Total operating revenues of the trunks reached a new high of $525 million, a 13% improvement over the $465 million attained in 1949. Passenger revenues also increased by 13% from a total of $382 million in 1949 to $432 million in 1950. Mail revenues remained about the same at $45 million. However, it is noteworthy that *the trunk industry had required $20 million in mail revenues to break even in 1949, but netted $15 million in operating income before mail pay in 1950.*

While total revenues were improving 13% over 1949, operating expenses increased only 5.6%. Expenses went from $440 million in 1949 to $564 million in 1950, a net increase of $25 million. However, unit costs per available seat mile decreased from 3.9c to 3.7c to continue a downward trend. Contributing to this favorable trend were improved utilization of equipment and personnel and use of larger and faster aircraft types.

Revenue passenger load factor for the trunkline carriers was 62.68% during 1950 as compared with 59.17% in 1949. Contrasted with this improvement in actual load factor experienced is the reduction in break-even load factor to 53.95% in 1950 from 55.38% in 1949.

Revenue passenger miles for the trunks increased during 1950 by one and a quarter billions to just under 8 billion, accompanied by a reduction in yield from 5¾c per revenue passenger mile in 1949 to 5½c in 1950.

INTERNATIONAL

INCOMPLETE reports for 1950 operations of the twelve U. S. international and overseas carriers indicate that this group will show a net operating income of approximately $19 million for the year, slightly less than that realized in 1949, despite an indicated reduction in mail revenues of as much as $8 or $10 million.

Results for Northwest, Pan American, and Panagra are available for only 11 months of 1950, and pro rata adjustment of their figures has been made to estimate year-end results. On this basis it appears that passenger revenues will slightly exceed those for 1949, while combined freight and express revenues may total $2 or $3 million less and non-scheduled activities may produce $3 or $4 million more.

Operating expenses for the year 1950 are indicated to be $6 or $7 million less than in the preceding year, although available seat miles increased to 3.8 billion from a previous total of 3.6 billion. However, revenue plane miles for this group dropped from 105 million in 1949 to 97 million in 1950, revealing the effects of operating larger types of equipment. Unit costs per available seat mile flown in 1950 in the international field will clearly show a reduction, as has been the case domestically.

Revenue passenger miles in international operations increased approximately 10% over 1949, but passenger revenues will not show a corresponding increase. Off-season and other promotional fares brought about reductions in the average yield per revenue passenger mile. From the incomplete data available, it appears likely that the reduction in passenger yield will be favorably offset by reduced unit costs of operation and additional traffic generated.

LOCAL SERVICE

LOCAL service operators reported a net operating income of two-thirds of a million in 1950, compared with a net loss of one-third of a million in 1949.

Their total operating revenues at $27.6 million were up 32% from $20.9 million in 1949. Passenger revenues were up 38% and mail revenues up 25%, the latter attributable largely to newcomers in the field. Total operating expenses at $26.9 million increased by 27% over $21.2 million reported for 1949.

Nine of the carriers which had operated throughout 1949, namely, Empire, Frontier, Piedmont, Pioneer, Robinson, Southwest, Trans-Texas, West Coast, and Wisconsin Central, reported $1 million net operating income in 1950 as against $370,000 in 1949. Their operating revenues were up 8.7% over 1949 and their expenses up only 5.1%. Mail revenues remained about the same for this group of nine, but while mail revenues represented 60% of total revenues in 1949, this relationship dropped to 55% in 1950, indicating a slow but favorable trend toward less dependency on mail pay by this class of operator.

Turn page for comparison of all U. S. scheduled airline revenues-expenses for 1950-49. Data from Official airline reports to CAB.

U. S. Airline Revenues--Expenses, 1950-49

Scheduled Domestic

	Passenger Revenues 1950	Passenger Revenues 1949	Freight Revenues 1950	Freight Revenues 1949	Express Revenues 1950	Express Revenues 1949	Mail 1950
American	$97,101,528	$84,915,565	$ 6,966,987	$ 5,962,307	$ 2,575,344	$ 1,836,438	$ 5,916,510
Braniff	12,409,384	11,393,620	409,087	275,272	349,663	266,181	2,193,719
Capital	22,179,403	19,237,207	1,547,848	1,521,340	786,050	567,937	3,818,875
Caribbean-Atl.*	498,606	522,995	26,307	32 898	.....	.....	165,726
C & S	6,796,233	6,330,851	216,459	150,418	251,878	169,304	1,747,320
Colonial	2,899,095	3,103,724	42,970	45,743	33,954	27,132	1,143,487
Continental	4,100,018	3,557,067	124,875	90,164	45,178	35,983	1,729,247
Delta	15,595,831	12,635,875	586,733	401,566	323,437	209,499	1,770,067
Eastern	69,084.327	61,293,018	1,873,263	1,804,428	1,556,547	1,202,521	3,372,004
Hawaiian	2,903,928	2,931,966	249,768	291,016	122,198	130,246	32,733
Inland**	2.255,297	1,967,002	39,892	30,721	25,483	21,705	715,612
MCA‡	6,056,546	5,764,127	125,210	89,592	88,506	73,919	1,742,862
National	13,413,718	10,228,284	476,849	240,678	216,058	187.524	1,747,962
Northeast	4,440.034	3,992,450	109,055	82,606	80,583	45,886	1,519,268
Northwest*	24,579,193	22,497,714	1,190,631	1,003,550	618,473	554,816	2,647,497
Trans-Pac.*	602,905	344,919	9,460	14,782	2,004	489	.....
TWA	60,889,741	52,750,808	2,666,529	2,265,824	2,225,847	1,586,128	5,853,250
United	77,959,299	72,388,958	5,043,216	4,258,363	3,112.373	2,073,266	7,341,612
Western**	8,609.782	6,057,174	164,567	100,753	168,678	99,004	1,374,419
TOTALS	**$432,374,868**	**$381,913,324**	**$21,879,706**	**$18,662,021**	**$12,582,254**	**$ 9,087,978**	**$44,830,170**

‡ Includes operation of local service route No. 106. * Figures for 1950 are thru November only. ** Operations of Western and its subsidiary, Inland, should be considered as consolidated, although reports are filed separately.

International Airlines

	Passenger Revenues 1950	Passenger Revenues 1949	Freight Revenues 1950	Freight Revenues 1949	Express Revenues 1950	Express Revenues 1949	Mail 1950
American	$ 3,406,570	$3,247,799	$ 274,300	$ 221,220	$ 4,495	$ 836	$ 93,480
AOA‡	13,075,311	15,430,391	965,338	.....	.....	1,809,841	2,981,061
Braniff	3,318,890	2,233,310	253,702	94,138	.....	.....	1,937,442
C & S	1,916,124	2,081,426	193,837	109,434	.....	.....	1,514,928
Colonial	1,098,515	791,704	12.943	21,341	.....	.....	315,352
Eastern	799,340	737,956	56.309	85,351	.....	.....	65,789
National	1,433,138	1,111,874	27,245	.....	57,721	115,133	54,026
Northwest*	6,064,770	5,376,228	1,804,958	1,572,140	50,133	32,772	5,106,149
Pan American*							
Latin Amer.	36,903,765	40,522,770	.....	.....	6,556,446	7,062,915	7,107,917
Atlantic	25,970,836	27,347,562	.....	.....	2,889,970	3,552,367	16.437,349
Pacific	14.204.266	16,821,525	.....	.....	2,013,035	2,665,717	11,340,012
Alaska	2,434,548	2,494,152	.....	.....	896,533	930,015	1,084,751
Panagra*	8,656,875	10,753,391	.....	.....	642,504	943,648	3,431,909
TWA	27,385,651	25,807,354	2,544,335	.....	.....	2,756,408	9,069,503
United	3,995,923	3,621,537	145,908	.....	.....	132,456	495,709
TOTALS	**$150,664,522**	**$158,378 979**	**$ 6.278,875**	**$ 2,103,624**	**$13,110,837**	**$20,002,108**	**$61,035,377**

‡Figures are thru September 25, 1950, effective date of PAA-AOA merger. * Figures for 1950 are thru November only.

Local Service Airlines

	Passenger Revenues 1950	Passenger Revenues 1949	Freight Revenues 1950	Freight Revenues 1949	Express Revenues 1950	Express Revenues 1949	Mail 1950
All American	$ 1,290,529	$ 606,883	$.....	$.....	$ 47,757	$ 21,574	$ 1,575,209
Bonanza*	237,572	7,562	4,496	30	761	15	475,487
Central	74,343	6,991	.....	.....	.....	.....	636,334
Empire	369,962	312,467	.....	.....	5,833	4,222	603,186
Frontier**	913,125	848,085	43,699	39,372	19,864	18,042	2,204,321
Lake Central	119.238	5.776	.....	.....	15,972	134	409,067
Mid-West	47,596	3,729	.....	.....	.....	.....	562,051
Ozark***	34,581	.....	.....	.....	2,350	.....	121,651
Piedmont	1,531,327	1,118,530	37,552	18,652	29,571	13,476	1,478,886
Pioneer	1,793,059	1,492,224	41,240	25,681	17,657	10,667	1,279,648
Robinson*	539,609	448,618	10,308	7,623	15,908	.....	536,339
Southern	360,787	101,077	.....	.....	14.670	5,785	1,374,063
Southwest	1,139,969	1,059,558	43,925	36,007	18,877	14,136	943,388
Trans-Texas	675,450	537,579	18,688	11,013	10,554	7,940	1,777,483
West Coast	555.068	515,927	6,635	.....	6,086	5,928	685,538
Wiggins	17.793	2,411	.....	.....	.....	.....	228,854
Wis.-Central	427.378	271,576	.....	.....	18,637	8,364	1,355,145
TOTALS	**$10,127,386**	**$ 7,338,993**	**$ 206,543**	**$ 138,378**	**$ 224 497**	**$ 110,283**	**$16,247,150**

* Figures for 1950 are thru November only. ** Formerly Challenger Airlines and Monarch Air Lines, merged June, 1950. ***Began operations September 26, 1950.

Trunk Airlines

U. S. Airline Revenues--Expenses, 1950-49

Revenues 1949	Total Operating Revenues 1950	Total Operating Revenues 1949	Total Operating Expenses 1950	Total Operating Expenses 1949	Net Operating Income 1950	Net Operating Income 1949	
$ 5,379,391	$114,653,557	$99,404,070	$91,734,730	$89,961,916	$22,918,827	$ 9,442,154	American
2,321,341	15,702 258	14,527,520	13,597,855	14,050,713	2,104,404	476,807	Braniff
4,567,313	29,816,460	26,905,836	27,579,706	25,586,399	2,236,753	1,319,437	Capital
209,726	732,863	792,269	768,086	801,241	—35,224	—8,972	Caribbean-Atl.*
1,800,384	9,146,331	8,583,730	8,442,261	7,783 557	704,070	800,173	C & S
1,225,679	4,176,594	4,445,132	4,562,259	4,228,691	—385,664	216,441	Colonial
1,379,129	6,221,793	5,247.499	5,837,886	5,560,788	383,907	—313,289	Continental
2,384,488	18,869,918	15,897,974	16,718,084	15,191,108	2.151,833	706,866	Delta
3,246,459	77,416,194	68,853,652	67,914,584	64,908.783	9,501,610	3,944,869	Eastern
37,259	3,492,055	3,518,404	3,497,715	3,392,732	—5,660	125,672	Hawaiian
640.905	3,064,515	2,682.934	2,584,139	2,178,305	480,376	504,630	Inland
1,467,276	8,238,390	7,515,155	7,557,007	6,975,367	681,384	539,789	MCA‡
2,024.186	16,948,674	12,983,817	14,479,037	12,931.162	2,469,637	52,655	National
1,565.437	6,360,546	5,793,502	6,240,008	5,728,267	120,537	65,234	Northeast
2,962,918	29,467,862	27,360,509	34,625,160	28,541,587	—5,157,299	—1,181,078	Northwest
.....	775,724	529,759	859,645	834,559	—83,920	—304,799	Trans-Pac.
5,719,927	73,180,399	63,710,914	66,494,315	61,115,273	6,686,083	2,595,641	TWA
6,482,909	95,711,415	87,010,702	81,493,396	82,035,526	14,218,019	4,975,176	United
1,863,267	11,181,979	8,859,596	9,995,095	8,379,765	1,186,884	479,832	Western
$45,277,994	$525,157,527	$464,622,974	$464,980,968	$440,185,739	$60,176,557	$24,437,238	TOTALS

International Airlines

Revenues 1949	Total Operating Revenues 1950	Total Operating Revenues 1949	Total Operating Expenses 1950	Total Operating Expenses 1949	Net Operating Income 1950	Net Operating Income 1949	
$ 95,666	$ 4,031,144	$ 3,801,803	$ 3,702,449	$ 3,750,839	$ 328,694	$ 50,964	American
4,187,624	18,325,117	23,416,605	18,818,747	23,808,198	—493,630	—391,592	AOA‡
1,503.001	5,663,610	3,925,611	5,577,129	3,920,711	86,481	4,900	Braniff
1,504,706	3,738,713	3,784,794	3,448,721	3,419,907	289,991	364,887	C & S
342,280	1,458,675	1,165,254	1,343,642	1,517,659	115,034	—352,405	Colonial
46,745	1,089,474	892,146	1,007,241	932,581	82,233	—40,435	Eastern
111,753	1,598,450	1,398,145	1,684,748	1,442,494	—86,298	—44,349	National
5,665,009	13,762,851	13,140,508	10,552,935	10,478,448	3,209,916	2,662,060	Northwest*
13,754,502	54,532,442	65,513,469	53,004,343	61,824,192	1,528,099	3,689,277	Pan American* Latin Amer.
19,097,783	48,151,494	53,477,386	43,969,937	48,990,181	4,181,557	4,487,205	Atlantic
13,729,111	29,280,486	34,693,532	26,168,920	31,753,317	3,111,566	2,940,214	Pacific
1,651,296	4,652,977	5,170,002	4,385,840	4,859,396	267,138	310,606	Alaska
3,690,602	13,846,934	16,825,639	12,526,852	15,407,763	1,320,081	1,417,877	Panagra*
9,228,736	43,811,833	42,274,321	38,825,334	37,562,333	4,986,499	4,711,988	TWA
588,258	5,682,601	4,543,137	7,271,195	3,799,908	—1,588,594	743,230	United
$75,197,072	$249,626,801	$274,022,352	$232,288,033	$253,467,927	$17,338,767	$20,554,427	TOTALS

Local Service Airlines

Revenues 1949	Total Operating Revenues 1950	Total Operating Revenues 1949	Total Operating Expenses 1950	Total Operating Expenses 1949	Net Operating Income 1950	Net Operating Income 1949	
$ 1,347,428	$ 2,933,614	$ 1,987,490	$ 3,245,869	$ 2,425,538	$—312,255	$—438,048	All American
18,407	727,494	26,443	749,630	29,359	—22,137	—2,916	Bonanza*
136,422	719,735	143,922	775,047	154,751	—55,312	—10,829	Central
955,370	1,001,554	988,148	977,476	900,799	24,078	87,349	Empire
3,105,185	3,210,071	3,037,656	3,385,163	3,031,612	—175,091	6,045	Frontier**
21,151	845,888	28,270	820,116	43,129	25,711	—14,859	Lake Central
64,115	610,121	68,066	576,047	92,765	34,074	—24,699	Mid-West
.....	159,937	.....	305,336	.....	—145,398	.....	Ozark***
3,242,466	3,104,596	2,437,419	2,830,337	2,409,040	274,220	28,379	Piedmont
3,375,780	3,335,140	3,303,735	3,106,861	3,031,136	228,279	272,599	Pioneer
1,145,894	1,113,855	907,594	1,095,700	1,136,049	18,156	—228,455	Robinson*
1,475,010	1,762,917	582,361	1,646,370	806,037	116,546	—223,675	Southern
2,349,992	2,213,745	2,398.581	1,952,668	2,263,878	261,077	134,702	Southwest
2,723,293	2,496,803	2,286.230	2,354,594	2,249,680	142.209	36,550	Trans-Texas
1,721,183	1,273,254	1,253,864	1,174,902	1,264.436	98,352	—10,572	West Coast
125,093	247,137	28,109	256,414	44,547	—9,276	—16,438	Wiggins
1,096,881	1,806,432	1,385,734	1,642,416	1,339.514	164,016	46,220	Wis.-Central
$13,003,670	$27,562,293	$20,863,622	$26,894,946	$21,222,270	$ 667,530	$—358,647	TOTALS

Airline Industry Still Growing

Assets
$818 Millions

Operating Equipment
$349 Millions

Payroll
$320 Millions

THE U. S. air transport industry—domestic trunk, local service and international airlines—continued to show strong economic growth and at the end of the third quarter of 1950 the industry's total assets passed the three-quarter billion dollar mark.

From an analysis of Civil Aeronautics Board reports filed by the 44 airlines in operation during the year ended September 30, 1950, total assets had exceeded $818 million, an increase of more than $98 million for the same period in 1949 when 38 companies were operating. The six additional carriers to commence operations since mid-1949 were four certificated all-cargo lines, Airnews, Flying Tiger Line, Slick Airways and U. S. Airlines; and two local service carriers, Bonanza Airlines and Mid-West Airlines.

At the end of last September, the depreciated value of the industry's airplanes was $181,482,633, as compared with $168,361,945 at September 30, 1949. Total flight equipment including planes, engines, propellers, etc., was valued at $276,890,646, up $2¼ million over 1949. Total operating property and equipment was worth $349,916,007.

Employment and payroll of the industry was also expanding and at the end of September, 1950, total employment was 81,070, payroll $319,840,489 and average wage was $3,945. Total employment was still far below the peak 96,554 employed in 1946 but the

Selected Airline Expenditures, Year Ended Sept. 30, 1950

Company	Total Assets	Passenger Food Expense	Other Passenger Supplies	Advertising Space	Other Advertising	Aircraft Engine Fuel and Oil	Shop-Servicing Supplies	Employment	Annual Payroll	Average Wage
Airnews	$193,636	None	None	None	None	$31,834	$1,092	14	$62,194	$4,442
All American	2,396,338	$10	$2,138	$36,560	$18,205	429,227	17,712	410	1,538,084	3,751
American	134,431,757	2,694,165	564,536	1,620,815	598,348	13,586,708	648,801	11,355	44,714,693	3,938
American Overseas	25,871,027	287,770	104,480	444,939	218,576	3,263,946	40,990	1,292‡	4,648,856‡	3,541‡
Bonanza	535,964	2,081	1,390	9,090	6,733	94,739	4,473	106	389,084	3,653
Braniff	14,400,345	398,974	73,735	375,442	297,379	2,789,890	142,239	2,482	8,707,464	3,508
Capital	17,063,456	405,026	109,574	1,046,073	126,494	4,004,875	188,076	3,336	13,109,038	3,930
Caribbean-Atl.	431,804	686	1,870	10,800	9,921	66,405	7,250	148	374,506	2,530
Central	421,124	None	97	11,240	4,952	40,135	6,453	89	338,085	3,799
C & S	7,924,388	299,972	40,325	259,235	99,558	1,527,202	103,399	1,242	5,033,550	4,053
Colonial	3,034,713	152,340	41,349	86,388	39,677	710,154	16,420	616	2,401,941	3,899
Continental	4,510,021	101,990	13,321	70,129	55,586	731,569	39,925	720	2,905,414	4,035
Delta	12,649,776	385,693	53,247	394,544	124,280	2,506,768	132,754	2,096	7,726,341	3,686
Eastern	55,340,636	1,055,049	177,896	1,312,396	515,999	10,248,921	400,387	7,759	30,249,026	3,897
Empire	458,987	3,963	1,419	7,465	12,742	143,350	4,364	113	470,545	4,164
Flying Tiger Line	3,872,355	None	None	20,287	5,282	754,440	16,607	947	3,452,450	3,646
Frontier	1,515,046	12,026	8,427	28,403	9,081	448,512	37,561	568	1,983,293	3,492
Hawaiian	2,601,158	None	6,114	30,398	38,278	297,179	15,814	439	1,803,281	4,108
Helicopter A. S.	425,315	None	None	None	None	15,767	3,832	35	157,200	4,492
Inland	1,335,079	51,931	8,240	38,385	5,527	386,725	2,878	216	1,000,135	4,630
Lake Central	323,380	999	461	5,465	1,935	80,652	849	65	265,728	4,088
Los Angeles	257,926	None	None	None	480	29,888	1,652	43	172,661	4,015
Mid-Continent	4,679,114	118,247	18,927	123,965	50,341	921,657	15,434	1,074	4,078,036	3,797
Mid-West	184,805	None	16	2,246	1,598	54,044	1,342	61	235,579	3,862
National	11,201,599	332,112	69,684	560,707	81,298	2,348,330	115,831	1,742	6,554,969	3,763
Northeast	4,773,539	129,696	17,516	69,143	110,352	684,977	45,664	735	2,847,621	3,874
Northwest	47,620,569	706,883	236,398	874,306	378,811	7,225,337	412,723	5,260	21,967,643	4,176
Pan American										
Atlantic	76,135,703	698,374	155,196	910,413	602,896	6,515,574	167,383	3,324	14,333,842	4,312
Latin American	64,245,305	852,906	264,648	1,083,890	907,980	7,224,619	493,229	5,904	21,788,652	3,690
Pacific	37,612,947	468,595	134,025	396,068	353,093	4,099,770	121,475	2,312	11,524,521	4,980
Alaska	4,239,790	114,575	13,001	56,674	66,256	618,686	7,646	286	1,467,296	5,130
Non-divisional	27,493,649	None	None	None	None	None	None	1,480†	5,174,739	3,496
Panagra	18,624,299	174,089	80,900	274,070	244,548	1,761,946	39,827	1,698	3,414,611	2,011
Piedmont	1,505,104	8,319	4,723	61,762	21,642	447,801	5,826	368	1,218,863	3,307
Pioneer	1,268,246	40,406	9,552	62,694	29,943	437,913	17,502	399	1,489,646	3,733
Robinson	891,527	591	813	6,245	3,486	189,349	11,204	155	555,274	3,582
Slick	2,829,864	None	None	3,424	2,940	1,186,212	36,787	1,041	2,974,083	2,857
Southern	1,091,273	None	1,208	16,155	26,778	249,224	9,870	217	724,022	3,337
Southwest	1,450,716	None	681	19,684	53,745	239,879	20,807	260	1,035,530	3,983
TWA	102,816,040	1,774,943	719,346	1,520,182	1,393,664	14,077,339	484,726	8,642	36,463,910	4,219
Trans-Pacific	555,554	239	1,688	8,991	10,530	93,061	2,094	153	540,323	3,531
Trans-Texas	972,681	13,837	5,735	52,695	35,691	331,561	11,879	339	1,138,509	3,364
U. S. Airlines	402,059	None	None	3,303	881	257,376	3,225	81	356,475	4,400
United	105,135,571	1,460,771	491,224	991,728	921,581	11,951,945	500,810	9,955	42,371,032	4,347
Western	10,345,325	219,663	30,767	235,876	66,162	1,316,965	89,468	1,089	4,555,906	4,184
West Coast	1,038,605	None	442	10,341	18,916	119,654	4,497	163	593,736	3,634
Wiggins	213,645	None	None	2,758	1,819	29,572	790	23	86,824	3,775
Wis.-Central	839,138	None	492	13,529	8,461	150,688	4,932	218	845,278	3,877
TOTALS	**$818,250,898**	**$12,966,923**	**$3,465,601**	**$13,168,903**	**$7,582,445**	**$104,722,385**	**$4,458,499**	**81,070**	**$319,840,489**	**$3,945**
Totals, year ending Sept. 30, 1949	720,176,728	13,007,374	3,599,919	12,029,097	6,761,838	93,195,538	4,963,265	78,915	295,538,928	3,745

‡ As of June 30, 1950. † General accounting office.

DESIGNERS AND BUILDERS OF PRODUCTS FOR PRECISION INDUSTRIES 'ROUND THE WORLD

AUTOMATIC PILOT AND FLIGHT PATH CONTROL EQUIPMENT

AIRPLANE AND ENGINE INSTRUMENTS

AUTOSYN* AND MAGNESYN* REMOTE INDICATING SYSTEMS FOR:

- Fuel Flow
- Fuel Pressure
- Hydraulic Pressure
- Liquid Level
- Manifold Pressure
- Oil Pressure
- Position
- Temperature
- Torque Pressure
- Water Pressure

Fuel Flow Totalizing Systems
Manifold Pressure Gauges
Electric Tachometer Systems
Warning Units

FLIGHT AND NAVIGATION INSTRUMENTS

Accelerometers
Airspeed Indicators
Attitude Horizon Indicators
Dual Radio and Magnetic Compass Indicators
Gyro Flux Gate* Compasses
Magnetic Compasses
Rate of Climb Indicators
Turn and Bank Indicators
ODR Components

POWER SUPPLY EQUIPMENT

Alternators
Control Panels
Fault Protection Systems
Generators
Inverters
Line Relays
Overvoltage Protectors
Reverse Current Cutouts
Voltage Booster Dynamotors
Voltage Regulators
Power Failure Indicators

AIR PRESSURIZATION AND ICE ELIMINATION EQUIPMENT

Electronic and Mechanical De-Icer System Timers
Oil Separators
Pumps
Valves
Pressurization and Control Units

ENGINE STARTING EQUIPMENT

Booster Coils
Induction Vibrators
Relay Switches
Starters

ENGINE CONTROLS

Automatic Engine Power Controls
Automatic Engine Boost Controls

MISCELLANEOUS

Actuators—Linear and Rotary
Differential Pressure Switches
Oxygen Regulators
Gear Boxes
Flexible Drive Shafts
Turbine Power Supplies

SPECIAL PURPOSE ELECTRON TUBES

Amplifier Tubes
Counter Tubes
Gas-Filled Control Tubes
Klystron Tubes
Rectifier Tubes
Spark Gaps
Temperature Tubes
Voltage Regulator Tubes

PRECISION COMPONENTS FOR SERVOMECHANISM AND COMPUTING EQUIPMENT

Autosyn Synchros (Transmitters, Receivers, Differentials, Control Transformers, and Resolvers)
Amplifiers
Low Inertia Motors
Servo Motors and Systems
Transformers
Gyros
Rate Generators
Stabilization Equipment
Remote Controls and Indicating Systems

FOUNDRY PRODUCTS

Sand, Permanent Mold, and Die Castings of Magnesium and Aluminum, for a wide variety of Aircraft and Industrial Applications. Non-Ferrous Precision Plaster Mold Castings.

*REGISTERED TRADEMARK OF BENDIX AVIATION CORPORATION

ECLIPSE-PIONEER DIVISION OF Bendix AVIATION CORPORATION

TETERBORO, NEW JERSEY

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York

AMERICAN uses
MET-L-FLEX MOUNTS

First All-Metal • All-Weather
VIBRATION & SHOCK MOUNTS

Robinson unit mounts and all-metal mounting systems aboard American Flagships give maximum protection at minimum maintenance costs. Switch to MET-L-FLEX, made only by Robinson, and SAVE... CAA approved for airlines. Write today.

ROBINSON AVIATION INC.
TETERBORO, NEW JERSEY
Vibration Control Engineers

Airlines' Operating Property & Equipment

Flight Equipment

	Depreciated Value End of September, 1950
Aircraft	$181,482,633
Aircraft Engines	38,736,460
Aircraft Propellers	7,721,288
Aircraft Radio Equipment	5,022,021
Miscellaneous Flight Equipment	1,251,334
Flight Equipment Spare Parts Assembly	42,071,358
Improvements to Leased Flight Equipment	603,553
TOTAL FLIGHT EQUIPMENT	**$276,890,646**

Other Property & Equipment

Passenger Service Equipment	$ 1,376,787
Hotel, Restaurant and Food Service Equipment	1,048,650
Station Communication and Meteorological Equipment	1,581,291
Hangar Shop, Ramp Equipment	13,166,239
Motorized Vehicles and Equipment	2,838,287
Furniture, Fixtures, Office Equipment	7,128,988
Medical Equipment	61,148
Engineering Equipment	51,727
Airport, Airway Lighting Equipment	208,683
Storage, Distribution Equipment	873,257
Miscellaneous Ground Equipment	932,226
Buildings and Improvements on Land Owned	2,925,722
Buildings and Improvements on Land Not Owned	26,718,519
Improvements to Leased Property	7,565,491
TOTAL OTHER PROPERTY AND EQUIPMENT	**$ 67,473,347**
Construction Work in Progress	$ 5,428,354
TOTAL OPERATING PROPERTY AND EQUIPMENT	**$349,916,007**

FINANCING

for present and future needs...

This firm has long been associated with the financing of aviation enterprises and allied industries.

Current world conditions have stimulated public interest in the investment possibilities of firms manufacturing for, or providing transportation in, the aviation field.

Based on our familiarity with your problems and our tested facilities for distribution of securities, we offer services as underwriters, dealers, or financial consultants. Inquiries are invited.

BURNHAM AND COMPANY
Members New York Stock Exchange
15 BROAD STREET, NEW YORK 5, N. Y.

payroll was much larger and the average wage had increased substantially.

The AMERICAN AVIATION analysis further showed that:

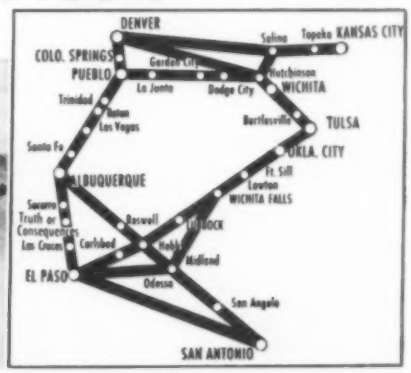
- **Feeding its passengers** cost the industry $40,451 less than the year before, down from $13,007,374 to $12,966,923, despite increased passenger traffic. Actually the majority of the lines' expenditures for passenger meals went up and the overall reduction was the result of substantial decreases effected by Eastern Air Lines and PAA's Latin American Division.
- **Purchase of advertising space** amounted to $13,168,903 for the 12-month period, which was over a million dollars more than was spent in the preceding 12 months. Biggest space buyer was Pan American World Airways, whose divisions placed $2,147,045 worth of advertising, with American Airlines next, followed by TWA, Eastern and Capital.
- **The industry spent $104,722,385 for gasoline and oil** during the 12 months ended last September. Pan American was in first place as the oil companies' biggest customer (combined expenditures of $18,458,649), second largest buyer of petroleum products was TWA with total purchases of $14,077,339.
- **Shop and servicing supplies** cost the airlines $4,458,499.

THE CENTER OF CONTINENTAL AIR LINES America's Vacation Land

Take your choice... high, dry, sunny and cool for summer... or warm and sunny for winter. Continental serves *both* the Rocky Mountain vacationland of Colorado and New Mexico... and the Sun Country of Southwest Texas and Southern New Mexico.

Pressurized Convair-liners offer 300-mile-an-hour luxury travel from Kansas City, Tulsa, Wichita or Oklahoma City to Denver, Colorado Springs... and via connections to the Pacific Northwest or the Dude Ranch Country of Wyoming and Montana. And *only* Continental offers one-plane service from Tulsa and Oklahoma City to Albuquerque, gateway to the Land of Enchantment. Plan the really big vacation this summer... in the Colorado-New Mexico Rockies. And plan on using Continental's convenient services to this colorful vacationland.

BE THERE instead of en route



UP THERE WITH THE BIG NAMES . . . CHAPTER NUMBER 3

when it's a DC-6 on Delta AIR LINES

. . . SKYDROL is flying high

DC-6's on Delta Air Lines get up and *go*. They get *away* up . . . where the air is thin . . . as they ply the airways of the Southern United States.

Cabin superchargers on *all* of Delta's high-flying DC-6's are being converted to Skydrol, Monsanto's fire-resistant-type hydraulic fluid. Skydrol gives the ships extra safety and permits longer service between supercharger overhauls. Skydrol has been proved efficient *wherever* hydraulic fluid is used in airplanes.

Both in the air and on the ground, ships have greater safety with Skydrol. The hazard of fire resulting from broken hydraulic lines is eliminated by Skydrol; thus both personnel and the multimillion-dollar investment in equipment are protected. And Skydrol's high lubricity *cuts maintenance costs*.

Investigate the possibilities for extra *safety* and *savings* that Skydrol holds for you. For information and a copy of the booklet, "*More Safety in the Air with Monsanto's Skydrol*," write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 S. Second St., St. Louis 4, Mo.

Monsanto Skydrol Offers These Advantages

SKYDROL is fire-resistant — exceeds the nonflammability requirements of Aeronautical Material Specification 3150.

SKYDROL is a proved superior lubricant. In most critical cases, lubricity more than double that of other hydraulic fluids.

SKYDROL is stable at required operating temperatures and pressures.

SKYDROL is noncorrosive to aircraft metals and alloys.

SKYDROL is nontoxic — does not require special handling or protective clothing.

Skydrol Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

• The scheduled airlines in 1950 set traffic and financial records on top of a record-setting 1949. Yet the spectacular event of 1950 was the contribution of the scheduled airlines to the Pacific Airlift: "The civil air carriers responded instantly and whole-heartedly to the emergency, and they have done a magnificent job," was the way Major General Laurence S. Kuter, Commander of the Military Air Transport Service, summed up airline aid.

As this is being written, the scheduled airlines' Pacific Airlift is about equal to the airlift provided during the critical early days of World War II. This time, however, the improved scheduling and utilization of the planes remaining in commercial operation have made it possible for the industry to continue airline services with no great inconvenience to passengers.

While Korea and the national emergency had an influence on all business during the last six months of 1950, there was evidence by mid-June and even before that air transportation was growing. Moreover, by providing service to the smaller and more remote communities, the local service airlines were beginning to show signs of achieving an established place in our national transportation system. Consequently, it is my opinion that 1950 would have been a good year even without the impetus of mobilization.

Between January and June of 1951, 18 Douglas DC-6's, 10 Lockheed Constellations, and 10 Martin 404's are scheduled for delivery to the domestic airlines. These new planes should compensate to a large degree for those taken over by the Pacific Airlift and should help the scheduled airlines meet the growing traffic demand.

Emphasizing that scheduled air transportation is basic to civilian transportation, Air Force Secretary Thomas K. Finletter said after the Korean invasion: "A plan must be developed . . . so that the airlines which are . . . an essential part of our transportation system can continue to operate as commercial airlines during the war, since the country will be . . . dependent upon them."

Dan A. Kimball, Undersecretary of the Navy, said: "We have learned to count upon our airlines as a source of planes for emergency use. We must, therefore, contribute to the airlines' peacetime health."

Subsequent priorities granted to the scheduled airlines have borne out the substance of these statements.

Since 1938, when economic regulation of commercial air transport was established nationally, the number of miles flown by the airline fleet in scheduled operations has increased 519 percent.

The scheduled airlines carried almost 13 times as many passengers in 1950 as in 1938, i.e., 19,332,674 in 1950 as opposed to 1,475,122 in 1938.

The number of passenger miles (number of passengers multiplied by the miles they traveled) jumped in 1950 to 17 times the 1938 total.

Air mail increased 6 times in this period, while air cargo and express sky-rocketed in 1950 to 70 times the 1938 figures.

It is reasonable to conclude that our system of air transportation has reached its present record-setting position because it has proved itself to be safe, economical, and expedient. This position could not have been achieved without the public's acceptance of the merits of the scheduled airlines of the United States.

Emory S Land *President*

Air Transport Association of America

• *Emory Scott Land, Vice Admiral, U.S.N. (Retired), is president of the Air Transport Association of America. He served in the Navy, from his graduation from Annapolis in 1902, until 1937, when he became a member of the U.S. Maritime Commission. He was designated Chairman of the Commission in 1938 and also served as War Shipping Administrator during World War II. During his Naval service, he was Assistant Chief of the Bureau of Aeronautics. He became a pilot at the age of 50 and devoted eighteen months' time to the Daniel Guggenheim Fund for the promotion of Aeronautics.*

HIGHLIGHTS OF AIR TRANSPORTATION GROWTH

In 1928 the domestic scheduled airlines were operating 268 airplanes. Today there are more than 1,100 aircraft in the scheduled service. This means that the domestic and international U. S. flag scheduled airlines can provide almost 70 million seat-miles per 24-hour day, or more than 25 million seat-miles per year.

Any one of the major scheduled airlines today can provide a greater "airlift" than all the lines together provided at the time of Pearl Harbor.

Today the domestic scheduled airlines are flying 15 times as many passenger miles in a single day as were flown in all of 1926. In other words, the airlines are today able to carry the equivalent of 85 percent of all the inter-city traffic carried by the country's railroads in 1949. Passenger miles flown by the world's international and domestic scheduled airlines in 1950 were 18 times more than those flown in 1937; while the passenger miles flown by the U. S. flag scheduled airlines in 1950 were 19½ times more than those flown in 1937.

In 1950 the domestic trunk lines carried more than 6 times as many pounds of mail in one day as were carried during the first year of commercial aviation—1926.

During 1950 the domestic trunk lines flew 379 times as many pounds of air express in one day as were flown during all of 1926.

In 1950 the domestic trunk lines flew approximately 2½ times as many freight ton-miles in one week as were flown during all of 1945.

There were 2.3 passenger fatalities per 100 million passenger miles for a ten-year period ending in 1949. In 1950 the rate was 1.2 passenger fatalities per 100 million passenger miles, an 80% drop in fatality averages. This improvement occurred during a period of approximately 5 million takeoffs and landings—or one every eight seconds.

Interline traffic business transacted by the scheduled Airlines Clearing House totalled $206,234,825.46 in 1950, representing a 22 percent gain over 1949.

AIRLINE EARNINGS RECORD, 1946-1950 Domestic and International Carriers

YEAR	Operating revenues	Net Operating Income	Federal Income Taxes	Net Income After Taxes	Net Assets	Percent Net Income to Net Assets
DOMESTIC AIRLINES						
1946	$317,205,010	($5,014,172)	($ 359,239)	($5,732,544)	$395,982,280	....
1947	364,839,577	(21,359,544)	(6,058,262)	(21,279,375)	448,209,598	....
1948	434,295,384	2,661,108	3,742,925	(5,478,777)	500,507,484	....
1949	486,033,846	24,300,951	7,510,136	11,947,776	504,634,950	2.36
1950	405,658,735	38,673,644	15,753,000	21,292,000	556,048,095	3.83
INTERNATIONAL (American Flag) AIRLINES						
1946	146,754,102	6,911,256	2,633,893	(4,353,197)	187,356,168	....
1947	209,009,531	(284,001)	651,458	(5,124,630)	163,397,789	....
1948	249,234,199	13,947,216	2,414,858	6,365,492	204,474,251	3.11
1949	274,154,538	21,291,408	1,361,867	7,454,189	195,470,000	3.81
1950	183,089,000	13,653,433	4,487,000	12,497,000	228,351,693	5.47
AIRLINE INDUSTRY						
1946	463,959,112	1,897,084	2,274,654	(10,085,741)	583,338,448	....
1947	573,849,108	(21,643,545)	(5,406,804)	(26,404,005)	611,607,385	....
1948	683,529,583	16,608,324	6,157,783	886,715	704,981,735	0.13
1949	760,188,384	45,592,359	8,872,003	19,401,965	700,104,950	2.80
1950	588,747,735	52,327,077	20,240,000	33,787,000	784,399,788	4.31

The scheduled airlines made their first modest post-war return investment in 1949, though the international segment of the industry earned slightly more than 3 percent in 1948. It has not been until 1950 in the post-war experience of the carriers that they have exceeded 4 percent. In the five year period of 1946-50 net earnings after taxes have averaged about $17½ million, or 2.7 percent on average assets for these years. Operating losses both before and after taxes are shown in parentheses. Where Federal income tax data are in parentheses the airlines were allowed to carry over taxes until a future year.

Traffic

For the third year, five U.S. flag scheduled airlines (four domestic and one international) topped the one hundred million revenue ton mile level. In 1950 one of the domestic carriers for the first time went above two hundred million revenue ton miles.

This undoubtedly means that in 1950, as in 1949, the first five places in worldwide airline traffic will be held by American carriers.

The introduction of air coach service at reduced fares, coupled with family fares and other incentive rates, added substantially to the increases in passenger traffic shown in 1950.

In 1949 coach fare traffic accounted for approximately 4 percent of the revenue miles flown, while in the first 7 months of 1950 coach fare travel was responsible for 12 percent.

Charter mileage has greatly increased in 1950.

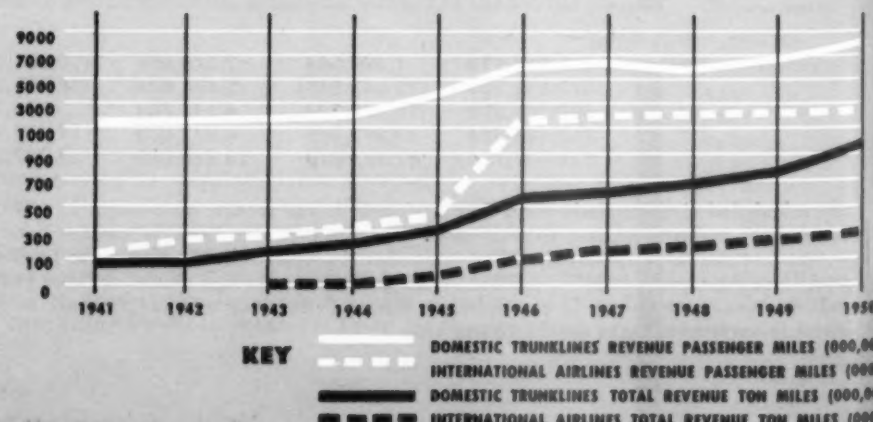
The Air Traffic Conference Military Bureau is experiencing million dollar months of group business in 1951. Another phase of importance in the charter field is transportation of college sports personnel. In 1950 at least 150 colleges and conventions used charter flights for this purpose.

Air cargo still holds its position as the most rapidly growing service, but the volume of mail and express also increased.

PASSENGERS • AIR MAIL • EXPRESS • FREIGHT

Year	Revenue Passenger (A)	Revenue Passengers Miles (000)	Passenger Load Factor	Air Mail Ton Miles (B)	Express Ton Miles	Freight Ton Miles	Total Rev. Ton Miles (000) (C)
DOMESTIC TRUNKLINES							
1941	3,848,882	1,384,733	64.32	13,118,015	5,258,551	.....	158,252
1942	3,136,755	1,418,042	76.45	21,162,102	11,901,793	.....	177,099
1943	3,019,736	1,634,135	89.98	36,061,868	15,139,359	.....	218,273
1944	4,045,965	2,178,207	90.77	51,139,973	16,991,598	.....	289,885
1945	6,376,843	3,336,278	88.16	64,998,094	20,509,753	1,168,534	427,978
1946	11,889,617	5,903,111	78.81	32,867,976	23,651,666	14,433,101	650,054
1947	12,279,016	6,103,879	65.67	32,878,825	28,533,362	35,213,590	683,360
1948	12,324,038	5,822,540	58.34	37,509,922	29,768,883	70,437,811	703,054
1949	14,021,047	6,562,580	59.03	40,874,188	27,329,361	94,189,591	801,508
1950	16,166,871	7,871,405	58.05	46,314,753	36,629,167	113,809,786	963,118
(Figures before 1945 include territorial lines)							
TERRITORIAL AIRLINES							
1945	194,957	24,865	87.08	20,317	325,569	181,514	2,487
1946	298,710	38,033	79.04	25,243	112,372	389,199	3,872
1947	375,607	46,833	71.10	39,786	115,774	635,925	4,702
1948	418,372	52,864	65.28	53,490	134,400	581,122	5,145
1949	381,840	47,154	61.06	70,219	124,121	602,834	4,744
1950	496,386	60,840	58.05	65,188	118,900	564,901	5,703
LOCAL SERVICE AIRLINES							
1945	4,452	1,312	52.78	74,510	11,482	.....	202
1946	25,118	6,812	37.92	60,088	24,354	25	688
1947	235,585	46,418	29.85	167,564	117,523	62,039	4,682
1948	425,695	87,928	27.14	361,984	189,550	264,794	9,040
1949	677,817	134,691	28.18	473,749	320,187	435,558	14,197
1950	987,990	200,939	32.87	561,529	614,150	714,421	21,479
INTERNATIONAL AIRLINES							
1941	228,524	162,824	65.57	....(D)	.....	.....	.....
1942	269,345	236,956	75.68	.....	.....	.....	.....
1943	279,402	244,229	79.42	1,990,715	5,088,325	.....	34,352
1944	341,496	310,574	79.37	2,048,150	6,207,137	.....	39,705
1945	475,558	447,968	76.78	3,399,339	8,717,511	.....	60,019
1946	1,041,283	1,100,741	70.85	6,141,461	15,090,468	.....	136,771
1947	1,359,712	1,810,045	61.90	12,755,998	30,786,465	2,109,948	238,459
1948	1,372,749	1,888,947	57.37	17,202,868	41,581,133	4,011,668	265,429
1949	1,520,067	2,053,980	56.67	19,365,769	49,443,623	6,714,414	297,169
1950	1,681,477	2,227,788	59.67	24,403,741	44,535,219	15,675,831	317,721

(A) Passenger figures for 1942 on, are unduplicated. (B) Does not include regular mail carried under special contract and foreign mail. (C) Includes excess baggage and revenue passenger ton miles. (D) International air mail is U.S. mail only.

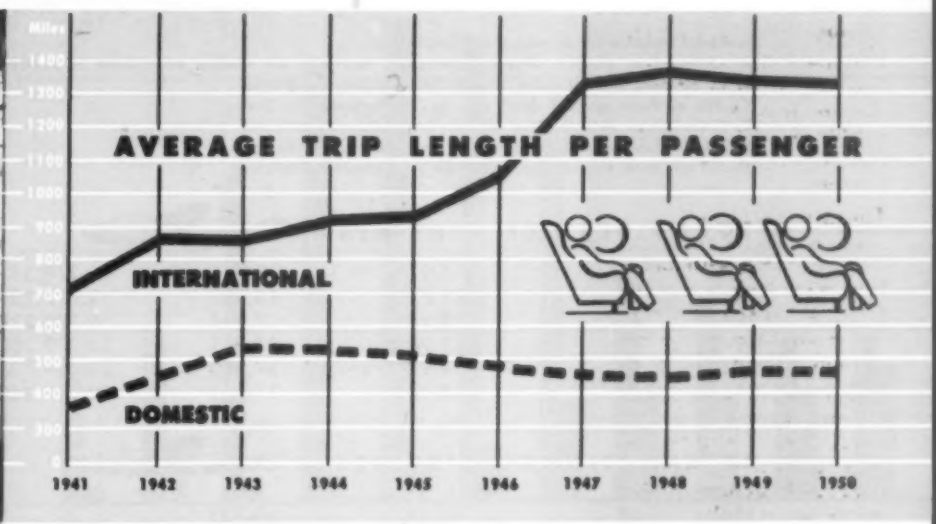


AIRLINE REVENUE PASSENGER MILES BY MONTHS

(In Thousands)

	DOMESTIC (A)				INTERNATIONAL			
	1947	1948	1949	1950	1947	1948	1949	1950
January	380,757	401,214	428,519	487,779	104,789	128,117	141,506	134,673
February	372,276	356,859	430,644	487,989	102,094	116,834	134,049	139,322
March	493,864	440,106	531,660	574,912	120,386	135,882	162,288	172,602
April	526,188	483,147	576,152	645,770	126,527	136,400	167,792	169,323
May	563,771	539,427	606,788	693,302	161,378	156,117	175,433	174,514
June	546,685	588,675	676,841	792,825	183,941	183,654	204,760	235,215
July	543,541	561,075	640,718	754,942	186,279	184,058	210,739	248,195
August	611,838	569,583	627,127	784,403	198,760	182,391	203,569	245,192
September	609,756	549,540	634,088	757,373	188,964	188,907	199,149	213,231
October	578,889	534,758	608,839	777,492	150,658	165,639	170,473	190,944
November	435,083	452,441	504,939	658,057	138,389	145,091	136,338	151,281
December	441,231	486,355	478,157	718,646	147,880	165,907	151,636	185,143
TOTAL	6,103,879	5,963,180	6,744,472	8,133,490	1,810,045	1,888,997	2,057,732	2,259,635

(A) Includes Trunklines, Territorial and Local Service Airlines.



AVERAGE PASSENGER FARES AND TRIPS

	Average Passenger Fare Per Mile		Average Trip Per Passenger	
	DOMESTIC*	INTERNATIONAL	DOMESTIC	INTERNATIONAL
1941	5.04¢	8.61¢	360	713
1942	5.28¢	8.85¢	452	880
1943	5.27¢	7.92¢	541	874
1944	5.35¢	7.82¢	538	910
1945	4.95¢	8.67¢	511	942
1946	4.63¢	8.31¢	487	1,057
1947	5.06¢	7.77¢	474	1,332
1948	5.76¢	8.01¢	453	1,370
1949	5.76¢	7.72¢	477	1,351
1950	5.50¢	7.00¢	461	1,324

*Trunklines only before 1945

PASSENGERS CARRIED

(Monthly Average)

	DOMESTIC	INTERNATIONAL
1933	41,851	6,199
1934	39,622	8,067
1935	63,568	9,275
1936	86,837	7,310
1937	94,195	9,360
1938	113,809	9,105(A)
1939	157,983	11,341
1940	253,218	14,182
1941	345,156	19,650
1942	296,614	23,017
1943	290,350	24,407
1944	396,776	29,722
1945	633,821	41,125
1946	1,142,113	88,845
1947	1,074,183(A)	113,284(A)
1948	1,121,092(A)	114,321
1949	1,256,725(A)	126,672(A)
1950	1,461,770(A)	140,123(A)

(A) Revenue Passengers only.

PLANES, SEATS and MILES

	Planes	Average Available Seats (A)	Route Miles	Revenue Miles in Passenger Service	Daily Average Revenue Miles Flown—All Services
DOMESTIC TRUNKLINES					
1940	369	16.54	44,643	109,871,044	300,823
1941	370	17.54	46,453	133,497,688	368,235
1942	186	17.91	49,297	109,648,081	305,043
1943	204	18.34	54,502	101,238,437	288,643
1944	288	19.05	62,937	133,532,043	379,050
1945	418	19.68	66,466	192,277,954	564,205
1946	659(B)	25.31	84,358	295,948,953	836,709
1947	737(C)	30.30	110,144	302,098,464	854,464
1948	779(D)	33.14	155,541	301,194,517	890,452
1949	771(E)	36.32	116,371	306,072,766	885,592
1950	796(F)	40.53	130,806	309,700,161	890,843

Territorial included in above table through 1944.
(A) Obtained by dividing available passenger seat miles by revenue miles flown in passenger service.
(B) 22 of these aircraft listed also on International certificates
(C) 388 of these aircraft listed also on International certificates
(D) 273 of these aircraft listed also on International certificates
(E) 285 of these aircraft listed also on International certificates
(F) 307 of these aircraft listed also on International certificates

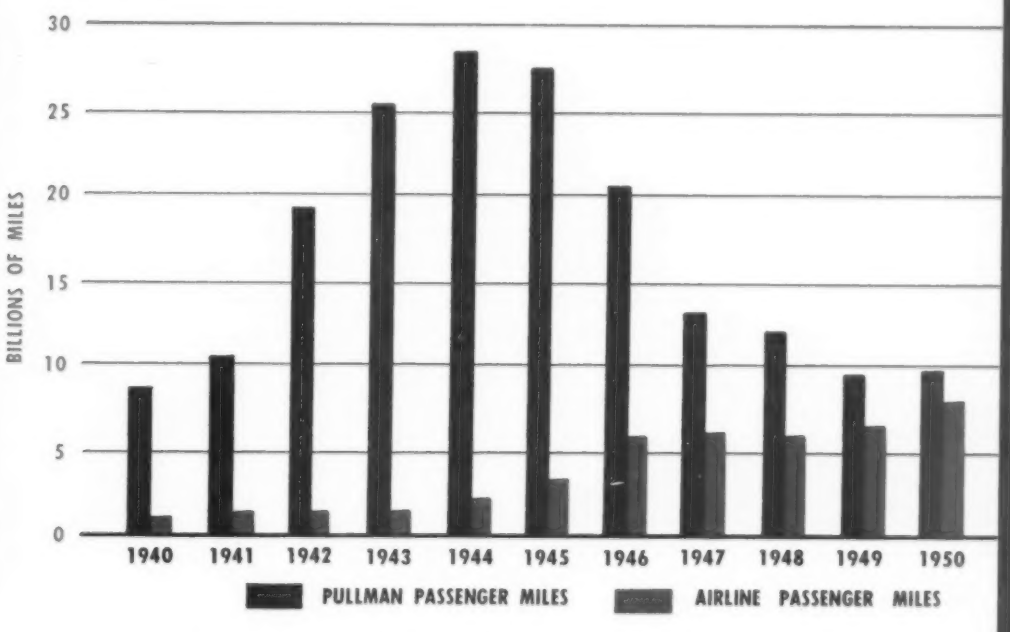
LOCAL SERVICE AIRLINES					
1945	3	8.92	2,115	278,553	4,852
1946	15	14.07	13,052	1,277,156	8,329
1947	40	18.74	17,226	8,299,228	27,678
1948	73	19.90	23,133	16,279,202	50,072
1949	99	19.98	29,963	23,924,331	68,344
1950	114	18.08	31,071	33,798,250	94,535
INTERNATIONAL AIRLINES					
1940	68	18.28	53,322	.....	26,371
1941	83	18.03	N.A.	.....	39,480
1942	68	17.73	N.A.	.....	51,181
1943	70	17.51	27,211	.....	50,569
1944	70	18.48	29,708	.....	60,854
1945	92	18.91	38,885	30,860,064	89,339
1946	136	27.21	66,419	57,097,662	162,673
1947	138	35.18	178,768	83,126,087	236,934
1948	160	35.06	177,905	93,891,245	267,906
1949	193	36.60	203,678	99,039,879	286,378
1950	208	42.33	N.A.	89,662,688	254,858
TERRITORIAL AIRLINES					
1945	5	21.86	562	793,008	456
1946	11	23.12	562	1,006,928	664
1947	16	23.99	562	2,745,328	8,417
1948	15	24.09	744	3,361,034	9,893
1949	20	24.11	772	3,203,113	9,462
1950	21	28.41	672	3,706,112	10,672

DOMESTIC AIRLINE PERCENTAGE OF FIRST CLASS TRAVEL MARKET

	Pullman Passenger Miles (000)	Airline Passenger Miles (000)	Total (000)	Airline Percentage of Total
1940	8,213,879	1,157,900	9,371,779	12.36
1941	10,070,407	1,506,303	11,576,710	13.01
1942	19,071,589	1,501,279	20,572,868	7.30
1943	25,891,466	1,670,935	27,562,401	6.06
1944	28,267,091	2,211,905	30,478,996	7.26
1945	27,275,789	3,408,290	30,684,078	11.11
1946	20,672,367	6,068,315	26,740,682	22.69
1947	13,515,792	6,307,690	19,823,482	33.40
1948	12,171,525	6,227,932	18,399,457	35.30
1949	9,349,319	6,746,425	16,095,744	41.91
1950	9,362,567(A)	8,133,184	17,495,751	46.49

(A) Estimated.

FIRST CLASS TRAVEL MARKET



INTERCITY PASSENGER MILES

	1943	1944	1945	1946	1947	1948	1949	1950
RAILROADS:								
Pullman	24,675	26,943	26,912	19,838	12,260	11,014	9,349	9,363
16 Trunk Airlines	1,617	2,161	3,336	5,903	6,011	5,823	6,563	7,871
Pullman and Airlines Combined	26,292	29,104	30,248	25,741	18,271	16,837	15,912	17,234
AIRLINE % OF THIS TOTAL:	6.15%	7.42%	11.02%	23.00%	32.90%	34.58%	41.25%	45.67%
RAILROADS:								
Day Coach	57,907	63,287	59,415	39,002	27,665	24,315	20,273	17,369
INTER-CITY MOTOR BUS LINES:	27,416	26,548	26,927	25,576	23,404	23,650	21,200	19,600
TOTAL RAILROAD COACH AND INTER-CITY BUS:	85,323	89,835	86,342	64,578	51,069	47,965	41,473	36,969
TOTAL RAILROAD, AIRLINE, BUS LINES:	111,615	118,939	116,590	90,319	69,836	64,802	57,385	54,203
PRIVATE AUTOMOBILE INTER-CITY:	147,131	151,251	179,837	253,570	274,008	287,420	300,101	325,909
TOTAL COMMON AND PRIVATE CARRIER:	258,746	270,190	296,427	343,889	343,348	352,222	357,486	380,112
COMMON CARRIER % OF TOTAL:	43.09%	44.05%	39.33%	26.29%	20.30%	18.40%	16.05%	14.26%
PASSENGER MILES PER CAPITA:	1,931	2,039	2,245	2,451	2,417	2,432	2,367	2,517

In 1950, for each passenger fatality on the domestic scheduled airlines, more than 83,000,000 passenger miles were flown, equal to more than 3,300 trips around the world at the Equator. The domestic scheduled airlines in 1950 flew 367,184,000 plane miles, with five fatal accidents. This is one accident for every 73,438,800 plane miles flown, or equal to flying 31,929 safe trips between Washington and Los Angeles. These accidents occurred during a period in which the scheduled domestic airlines were making approximately 5 million takeoffs and landings, an average of one takeoff or landing every eight seconds, day and night.

During 1950 the domestic and international U. S. scheduled air carriers combined flew approximately 18,828,000 passengers more than 10 billion passenger miles for a safety record of 1.4 passenger fatalities per 100,000,000 passenger miles. This is the second lowest passenger fatality record for combined domestic and international scheduled air carriers ever achieved in any one year.

The favorable safety record of the scheduled airlines is due to the strong emphasis they place on engineering and education in their daily effort to improve flying safety. In addition, they have continuous scientific maintenance programs in which the importance of safety is stressed. Every scheduled airline flight is planned and operated to provide first, safety; then comes passenger comfort and operation on schedule.

SCHEDULED AIRLINE PASSENGER FATALITIES

	DOMESTIC		INTERNATIONAL		TOTAL	
	Number of Fatalities	Fatalities per 100 Million Passenger Miles	Number of Fatalities	Fatalities per 100 Million Passenger Miles	Number of Fatalities	Fatalities per 100 Million Passenger Miles
1941	35	2.3	2	1.2	37	2.2
1942	55	3.7	0	0	55	3.1
1943	22	1.3	10	3.9	32	1.7
1944	48	2.2	17	5.3	65	2.6
1945	76	2.2	17	3.7	93	2.4
1946	75	1.2	40	3.6	115	1.6
1947	199	3.2	20	1.1	219	2.7
1948	83	1.3	20	1.0	103	1.5
1949	93	1.3	0	0	93	1.0
1950 (EST.)	96	1.2	48	2.1	144	1.4

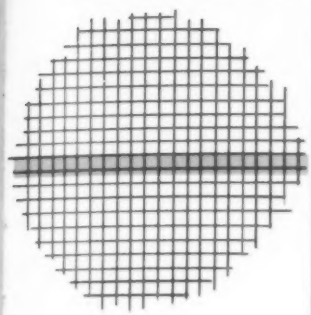
COMPARATIVE TRANSPORTATION SAFETY RECORD

	1942	1943	1944	1945	1946	1947	1948	1949	1950
Domestic Scheduled Air Transport Fatalities	55	22	48	76	75	199	83	93	96
Rate*	3.66	1.32	2.09	2.14	1.20	3.21	1.3	1.3	1.2
International Scheduled Air Transport Fatalities	0	10	17	17	40	20	20	0	48
Rate*	0	3.9	5.3	3.7	3.6	1.1	1.0	0	2.1
Bus Fatalities	x	x	x	120	140	140	120	120	x
Rate*	.23	.22	.22	.17	.19	.21	.18	.20	x
Railroad Passenger Fatalities	110	262	249	142	116	74	52	32	177
Rate*	.20	.30	.26	.16	.18	.16	.13	.09	.56
Passenger Automobiles and Taxicab Fatalities	x	x	x	12,900	15,400	15,300	15,200	15,300	x
Rate*	2.7	2.7	2.9	2.9	2.5	2.3	2.1	2.0	x

*—RATE PER 100 MILLION PASSENGER MILES

x—Not available

OPERATIONAL REGULARITY



by
MILTON W. ARNOLD
Vice President,
Operations and Engineering

It is generally difficult to measure true progress on a year-to-year basis. However, when measured over a period of several years, the degree of progress resulting from careful planning and development comes more clearly into focus.

In the case of aviation it has been possible to measure progress on a year-to-year basis; but, the full impact of the scheduled airlines' progress toward greater reliability of service and greater safety is best realized by viewing in retrospect the operational record of the scheduled airlines for the past four or five years.

In 1947, on a nation-wide basis, the scheduled airlines completed only 94.77% of the mileage scheduled, due either to weather conditions below acceptable and safe operating limits, or to severe air traffic congestion at the larger cities. Furthermore, in only one month of that year did the scheduled airlines complete more than 99% of the mileage scheduled.

Two years later, 1949, the scheduled airlines completed nearly 98% of the mileage scheduled throughout the year. And for six consecutive months during the same year, the scheduled airlines completed more than 99% of all mileage scheduled.

1950 produced a further, although less spectacular, improvement; and from all early appearances 1951 will register still greater progress.

Interruptions to a scheduled operation in the form of cancellations or delays are normally due to either the weather reaching a point below acceptable and safe standards of operation, or to traffic congestion (a condition where the capacity of the traffic control and navigation system is less than the demand for time in the system).

Of all the aids and devices installed to permit safe operation by aircraft under severe weather conditions, the Instrument Landing System (ILS) probably has contributed the most. The ILS, conservatively speaking, has eliminated more than 55% of all cancellations due to weather. Translated into terms of passengers and flights, the ILS each year guides to a safe landing millions of passengers on thousands of flights, including nearly 500,000 passengers on 12,500 flights, which number in 1950 would have been cancelled.

This is not to say that the ILS is sufficient alone; radar, High Intensity Approach and Runway Lights, as well as improved static-free communications and other new and improved aids, have all contributed a part.

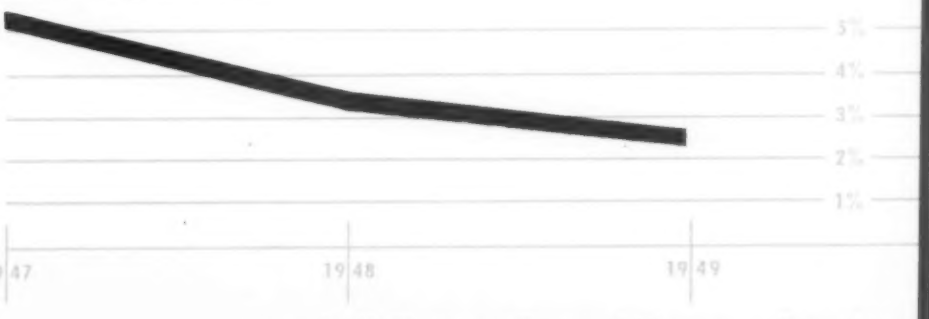
Equal progress has been made in the art and technique of air traffic control. The efficiency of this primary service of the Civil Aeronautics Administration is best measured by the number of aircraft which can land and depart each hour for sustained periods of time.

In 1947, the capacity of all but a very few airports permitted only 7 aircraft to land and an equal number to depart each hour during those periods when the weather was such that flight by instruments was required.

Today, under the same conditions, the capacity has been increased nearly two and one half times to 32 arrivals and departures each hour. It may be reasonably expected that this figure will be still further increased to a total of forty arrivals and departures at single-runway airports and to even more at the larger dual-runway type of airport.

I do not believe it is possible to attribute this remarkable progress entirely to any one individual or to any one organization or agency. Rather, it represents the combined efforts of the individuals comprising the civil government agencies and the three services of the military, as well as private enterprise represented by manufacturing, the research laboratory and the civil users of the air space. The incentive for this coordinated effort and interest is generated by the fact that aviation is a most vital part of the transportation and communications system, the defense and the economy of our great nation.

MILEAGE LOSS DUE TO WEATHER



Revenues

Since 1948 the percentage of mail revenues to total income has been declining in the domestic field. The bulk of the scheduled airline income comes from carrying passengers. The constant improvement in passenger service and a growing realization by the traveling public of the sound safety record, have been of great aid in the establishing of new passenger carrying records. Since revenue ton-miles in 1950 increased about twice as fast as total operating revenues, it is evident these various services showed rate declines. Such declines were noticeable in passenger rates, in rates paid for carrying the mail, and in express and freight traffic in the international and overseas traffic. Total operating expenses increased 5%, while total revenues were increased 8%. This difference in these two rates of growth largely explains the increase of 47% in total net operating income. Unit revenue (ton-mile) operating costs declined more rapidly than did ton-mile operating revenues. The greater part of this improvement in net operating income accrued to the domestic trunk airlines.

AIRLINE OPERATING REVENUES

Year	Passengers	% of Total	Mail	% of Total	Express & Fr.	% of Total	Others	% of Total	Total
DOMESTIC TRUNKLINES									
1941	$68,996,812	71.81	$22,297,222	23.21	$2,891,336	3.01	$1,896,829	1.97	96,082,2
1942	73,649,588	69.28	22,957,807	21.60	6,749,413	6.35	2,953,354	2.78	106,310,1
1943	86,045,193	72.37	23,562,311	19.82	8,015,163	6.74	1,380,230	1.09	118,902,8
1944	115,012,203	72.59	32,739,723	20.66	7,897,056	4.98	2,797,643	1.71	158,446,6
1945	164,427,954	77.85	32,831,438	15.59	10,470,649	4.96	3,395,082	1.60	211,125,1
1946	272,573,483	87.50	19,880,164	6.38	13,369,913	4.27	5,776,089	1.85	311,499,6
1947	303,193,782	86.01	23,325,630	6.62	18,888,243	5.36	7,082,710	2.01	352,490,3
1948	334,735,598	80.98	47,837,531	11.57	23,788,568	5.76	6,991,189	1.69	413,352,8
1949	378,113,445	82.24	45,031,010	9.79	27,280,566	5.93	9,357,824	2.04	459,782,8
1950*	428,641,666	82.10	46,086,168	8.83	34,232,704	6.56	13,122,757	2.51	522,083,2
LOCAL SERVICE AIRLINES									
1946	$314,638	16.29	$ 1,358,614	70.31	$13,008	0.67	$44,797	2.32	1,931,0
1947	2,280,124	26.99	5,957,097	70.51	60,179	0.71	150,931	1.79	8,448,3
1948	4,666,549	28.64	11,282,490	69.23	147,559	0.91	195,511	1.20	16,292,1
1949	7,362,007	33.55	14,054,998	64.06	252,159	1.15	271,465	1.24	21,940,6
1950*	10,235,000	37.09	16,250,000	58.89	448,300	1.61	664,206	2.41	27,597,5
INTERNATIONAL AIRLINES									
1941	$14,020,811	36.91	$15,472,179	40.73	$1,475,207	3.88	7,021,770	18.48	37,989,9
1942	20,970,792	51.31	9,038,810	22.12	4,318,924	10.56	6,541,299	16.00	40,869,8
1943	19,333,389	58.87	3,624,223	11.04	4,401,466	13.40	5,480,095	16.69	32,839,1
1944	24,287,050	62.46	2,889,093	7.43	5,705,470	13.90	6,309,785	16.21	38,852,4
1945	38,858,800	56.23	12,264,219	17.75	7,314,743	10.58	10,673,311	15.44	69,111,0
1946	91,416,767	62.29	25,060,609	17.08	11,413,268	7.78	18,863,467	12.85	146,754,3
1947	140,652,113	67.29	32,299,890	15.45	17,526,276	8.39	18,531,232	8.87	209,009,5
1948	151,337,705	60.72	57,335,669	23.00	20,808,679	8.35	19,752,146	7.93	249,234,1
1949	158,479,705	57.81	75,197,073	27.43	22,126,830	8.07	18,330,930	6.69	274,154,5
1950*	155,547,760	59.35	69,352,634	26.46	20,160,000	7.69	17,032,357	6.50	262,092,7

* Partial Estimate

WHERE THE DOMESTIC AIRLINE DOLLAR COMES FROM

WHERE THE INTERNATIONAL AIRLINE DOLLAR COMES FROM

pages 10 *and* 11, *Air Transport Facts and Figures . . . Financial*

AIRLINE OPERATING EXPENSES

Aircraft Operating Expenses	% of Total	Ground and Indirect Expenses	% of Total	Total Operating Expenses	Year
DOMESTIC TRUNKLINES					
$44,932,205	50.0	$44,986,928	50.0	$89,919,134	1941
36,392,090	43.1	47,974,400	56.9	84,366,489	1942
34,613,411	36.2	60,949,609	63.8	95,563,020	1943
45,150,125	36.3	79,371,967	63.7	124,522,092	1944
69,722,625	38.3	111,403,704	61.7	180,626,329	1945
127,411,526	40.18	189,709,954	59.82	317,121,480	1946
163,202,631	43.71	210,187,837	56.29	373,390,468	1947
189,990,818	46.15	221,486,955	53.85	411,227,773	1948
209,679,522	48.18	225,477,683	51.82	435,157,205	1949
228,307,000	48.88	239,001,000	51.12	467,308,000	1950*
LOCAL SERVICE AIRLINES					
$ 999,175	18.49	$ 1,064,254	51.65	$ 2,060,429	1946
4,462,277	39.20	4,607,078	50.80	9,089,205	1947
8,321,373	52.26	7,602,141	47.74	15,923,512	1948
11,810,227	52.27	10,570,938	47.25	22,381,218	1949*
13,604,000	50.56	13,300,000	47.44	26,904,000	1950*
INTERNATIONAL AIRLINES					
N. A.	N. A.	N. A.	N. A.	N. A.	1942
$11,997,694	37.38	120,097,295	62.62	332,078,989	1943
13,352,194	34.04	25,874,474	65.96	39,226,668	1944
23,218,023	37.11	38,846,750	62.89	61,264,282	1945
52,468,127	37.51	87,377,719	62.49	139,842,846	1946
93,765,715	44.80	115,527,815	55.20	209,293,532	1947
110,992,589	47.17	124,294,394	52.83	235,286,983	1948
122,333,638	48.38	130,529,491	51.62	252,863,129	1949
122,294,788	49.85	124,516,085	50.45	246,810,873	1950*

N.A.—Not Available
* Partial Estimate

DIRECT AIRCRAFT OPERATING EXPENSES

DOMESTIC TRUNKLINES	Flying Operations	% of Total	Direct Maintenance Flight Equip.	% of Total	Depreciation Flight Equip.	% of Total
1941	$27,391,837	30.5	$9,789,797	10.9	$7,750,571	8.6
1942	21,865,924	25.9	8,664,437	10.3	5,861,730	6.9
1943	20,739,121	21.7	9,132,260	9.5	4,742,030	5.0
1944	28,238,316	22.7	11,892,963	9.6	5,018,845	4.0
1945	43,421,033	24.0	16,392,654	9.1	9,408,938	5.2
1946	69,729,554	21.99	32,490,116	10.25	25,191,856	7.94
1947	85,932,761	23.01	41,029,360	10.99	36,240,510	9.71
1948	104,163,765	25.33	46,093,128	11.21	39,533,925	9.61
1949	119,961,143	57.21	50,270,468	23.97	39,447,911	18.82
1950*	133,722,297	58.52	55,207,291	24.16	39,577,412	17.32
LOCAL SERVICE AIRLINES						
1946	$ 497,458	24.14	$ 347,727	16.88	$ 151,010	7.33
1947	2,203,155	24.29	1,336,677	14.74	922,395	10.17
1948	4,526,827	28.43	2,348,309	14.75	1,446,234	9.08
1949	6,486,969	54.92	3,280,965	27.78	2,042,843	17.30
1950*	8,585,484	63.11	3,590,096	26.39	1,428,420	10.50
INTERNATIONAL AIRLINES						
1942	N. A.	N. A.	N. A.	N. A.	N. A.	N. A.
1943	$ 8,074,416	25.37	$2,172,952	6.77	$1,744,326	5.44
1944	8,469,557	21.59	3,030,386	7.73	1,852,251	4.72
1945	13,297,599	24.77	5,198,602	8.42	2,421,832	3.92
1946	32,447,634	23.20	11,062,761	7.91	8,953,731	6.40
1947	40,188,663	23.41	21,997,072	10.51	18,570,977	8.88
1948	47,163,026	28.35	24,241,052	10.30	19,598,344	8.33
1949	52,346,838	59.14	26,310,942	21.51	23,675,868	19.35
1950*	51,102,190	58.14	26,183,314	21.41	25,009,284	20.45

N.A.—Not Available
* Partial Estimate

Financial

In 1950 the scheduled airlines coupled their traffic increases with cost controls, making this year the most profitable on record. However, as shown on Page 3, in a five-year period, 1946-50, net earnings averaged only 2.7 percent on average assets for the industry in these years.

A major factor in airline growth has been and will continue to be the nature of flying equipment. The domestic fleet was almost completely modernized in the first three postwar years. The cost of this was heavy, and the year 1949 was the first since to see even modest profits for the airline industry as a whole.

It was not alone cost controls, however, that aided the airlines in reaching new heights in 1950. Probably never in the history of the industry have the individual airlines carried on a more strenuous sales effort than they did in 1950. Advertising budgets reached new highs, incentive fare plans were vigorously pushed, and group movements were promoted extensively both domestically and internationally—in the latter case, full advantage being taken of Holy Year. In addition, new and improved flying equipment began to contribute to holding down costs.

With all these efforts, the airlines were successful in making a noteworthy operating profit, despite the fact supplies and material were increasing in cost as were wages and salaries.

That the financial results of 1950 will continue in 1951 has been indicated by the fact several airlines reported a profit in the early months of 1951, a time of year which ordinarily means losses.

AIRLINE INDUSTRY NET OPERATING INCOME*

	DOMESTIC TRUNKLINES		LOCAL SERVICE		INTERNATIONAL	
	Operating income*	% Gross operating revenue	Operating income*	% Gross operating revenue	Operating income*	% Gross operating revenue
1940	$5,914,506	7.77	....	....	N.A.	....
1941	7,293,286	7.59	....	....	N.A.	....
1942	25,980,988	24.44	....	....	N.A.	....
1943	26,974,990	22.36	....	....	N.A.	....
1944	36,093,932	22.78	....	....	N.A.	....
1945	33,451,627	15.84	....	....	N.A.	....
1946	(5,228,439)	Loss	($129,372)	Loss	$6,911,256	4.71
1947	(20,900,101)	Loss	(620,974)	Loss	(284,001)	Loss
1948	2,075,114	0.50	368,998	2.34	13,947,216	5.60
1949	24,625,337	5.36	(441,086)	(Loss)	21,291,408	7.77
1950**	54,575,295	10.45	688,630	2.50	15,281,858	5.83

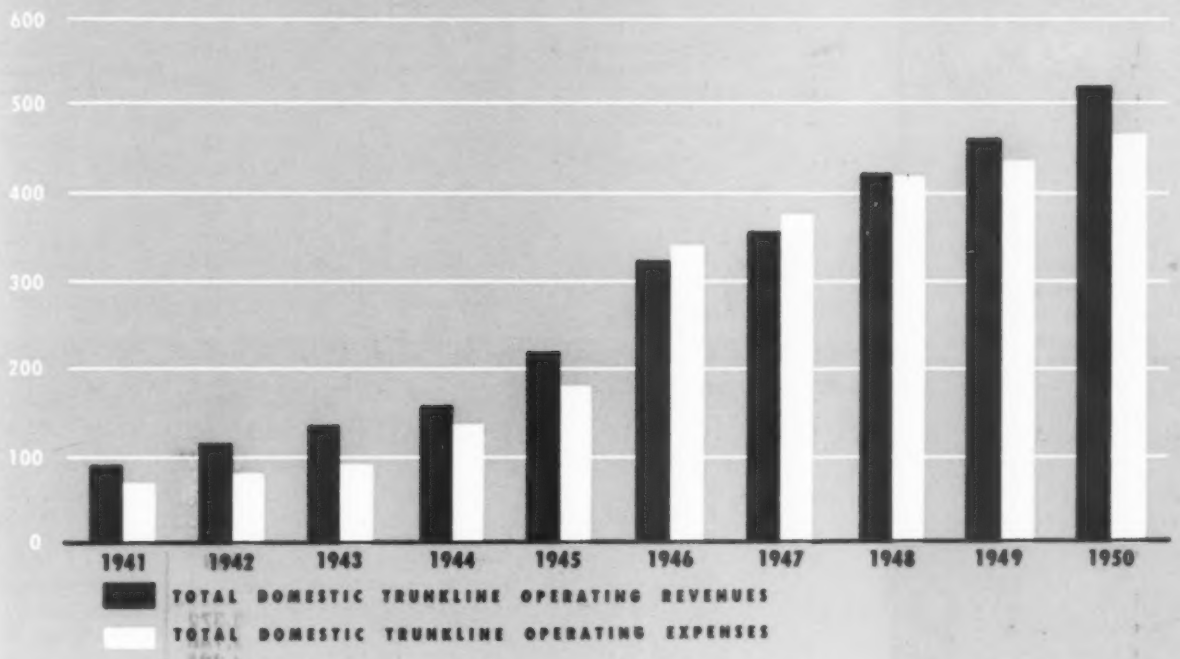
N.A. Not Available
* All income figures are before Federal Income Taxes
** Partially estimated

ASSETS and LIABILITIES DOMESTIC TRUNK AIRLINES

SELECTED YEARS	1940	1949	1950(A)	1950(B)
Current Assets	$36,017,487	$175,472,186	$207,134,000	$186,913,075
Flight Equipment (net)	31,221,243	188,619,849	195,207,000	186,446,942
Other Operating Property	.....	61,476,977	58,906,000	59,868,209
Non-Operating Property	117,026	2,704,375	2,242,000	2,539,653
Other Assets	4,030,661	58,668,273	73,774,000	71,751,585
Total Assets	71,386,417	486,941,660	537,263,000	507,518,464
Current Liabilities	15,391,299	98,428,787	129,792,000	112,673,531
Long Term Debt	4,257,770	148,017,443	138,266,000	138,525,888
Capital Stock	27,390,060	123,710,057	123,435,000	123,432,785
Capital Surplus	21,165,185	63,434,293	63,852,000	63,841,372
Earned Surplus	1,638,089	36,991,628	57,516,000	42,704,273
Operating Reserves	273,173	3,635,427	4,513,000	4,462,153
Other Liabilities	1,270,841	12,724,025	19,889,000	21,878,462
Net Worth & Liabilities	71,386,417	486,941,660	537,263,000	507,518,464
Net Worth	50,193,334	224,135,978	244,803,000	229,978,430

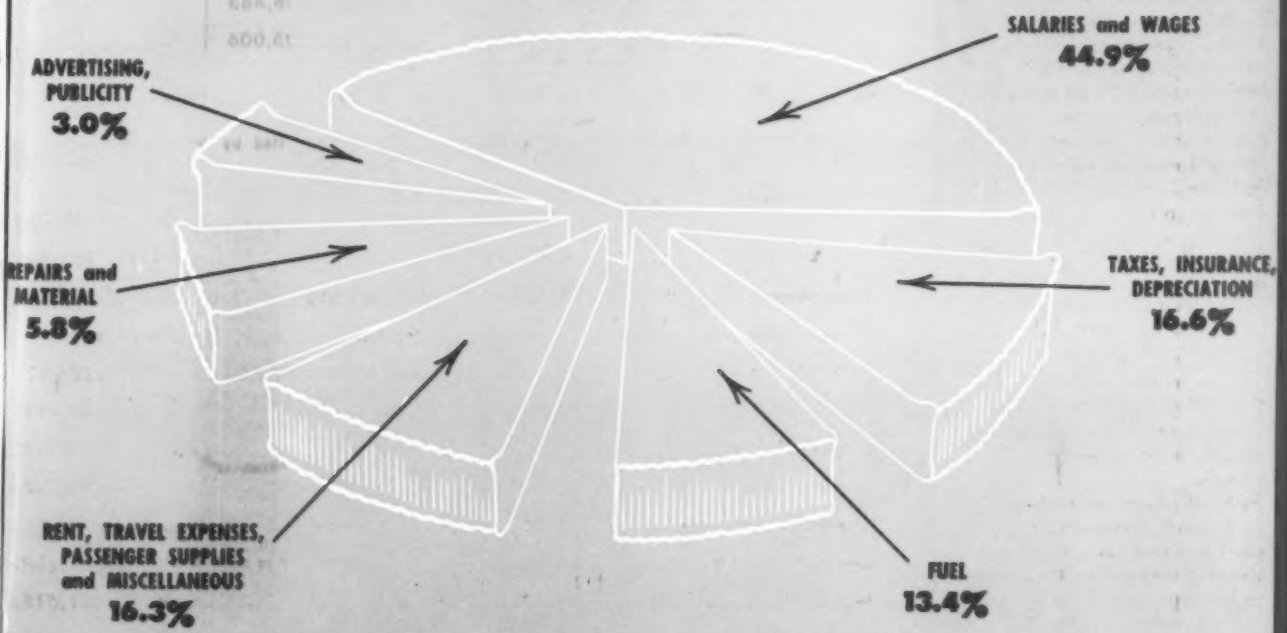
(A) As of September 30 (B) As of June 30

10 YEAR TREND OF TOTAL DOMESTIC TRUNKLINE OPERATING REVENUES AND EXPENSES



WHERE THE DOMESTIC AIRLINE DOLLAR GOES

(First 6 Months 1950)



Air Mail

The year 1951 marks the 25th anniversary of the carrying of air mail by private carriers. During this period the postal service and the scheduled airlines, working together, have developed modern air mail and the air parcel post at an amazingly low cost in public funds.

Post Office Department in report on air mail payments to a Senate Committee in 1949 declared: "Probably no investment ever made by this government ever returned greater national benefits in commercial and cultural progress, and national security. The over-all value of the air transportation system to the nation, particularly as an arm of national defense, has been incalculable . . ."

Of the $551,129,528 total postal "deficit," in fiscal 1949 less than 7 percent was attributed to domestic Air Postal Service. Domestic Second, Third and Fourth Class Mails alone accounted for 74 percent. The annual deficit incurred by the sale of penny postal cards totalled more than the deficit of air mail in any one year period.

Since the beginning of air mail in 1918, government costs in excess of revenues for both domestic and international Air Postal Service have averaged only $6,013,243 a year.

Approximately 85 percent of all domestic air mail and air parcel post is carried at no excess cost over revenues. So far as the so-called "air mail subsidy" is concerned, the users of air mail are the only ones subsidized.

AIR MAIL REVENUES AND PAYMENTS

DOMESTIC AIRLINES FISCAL YEAR ENDING JUNE 30

	Payments to Airlines	Postal Revenues	All Allocated Costs (A)	Net Result for P.O.
1939	$17,020,169	$16,326,358	$24,887,824	— $8,561,466
1940	19,425,732	19,122,906	28,341,758	— 9,218,852
1941	20,687,220	23,920,465	31,174,112	— 7,253,647
1942	23,473,170	33,417,367	37,092,816	— 3,675,449
1943(B)	23,308,477	62,818,568	44,463,207	+ 18,355,361
1944	28,401,371	79,412,510	49,794,609	+ 29,617,901
1945	33,557,040	81,237,389	49,902,849	+ 31,334,540
1946	21,953,760	68,427,924	49,578,803	+ 18,849,121
1947	25,661,562(D)	54,356,782	73,446,659	— 19,089,877
1948	47,384,762(D)	53,586,950	80,662,381	— 27,075,431
1949	61,088,880(D)	65,385,603	102,646,667	— 37,261,064
1950	60,943,786(D)	74,120,038	109,621,905	— 35,501,867
	$382,905,929	$632,132,860	$681,613,590	—$49,480,730

INTERNATIONAL AIRLINES FISCAL YEAR ENDING JUNE 30

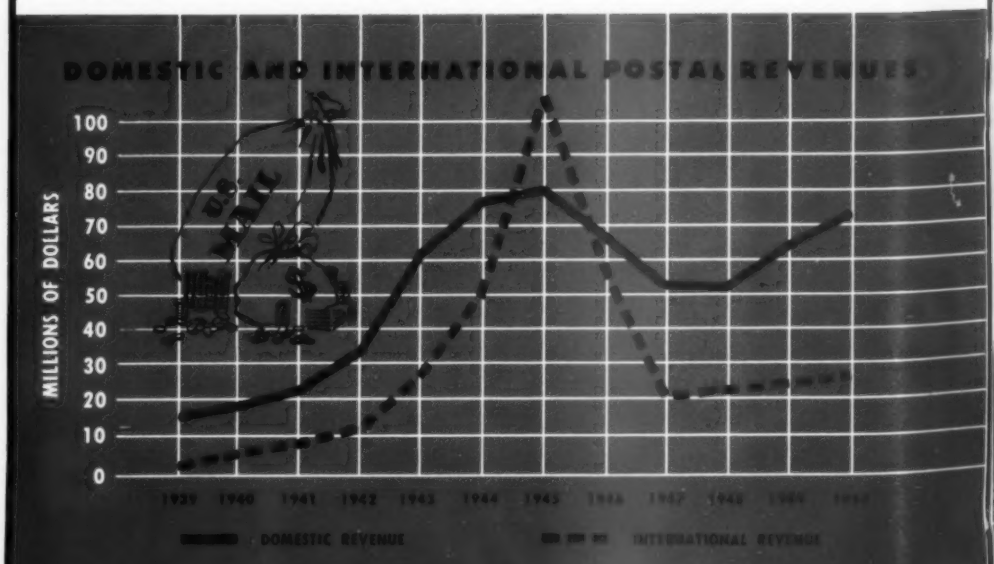
	Payments to Airlines	Postal Revenues	All Allocated Costs	Net Result for P.O.
1939	$ 9,327,445	$ 3,925,513	$ 9,903,372	—$ 5,977,859
1940	12,438,825	5,914,405	13,223,146	— 7,308,741
1941	15,639,439	9,309,793	16,584,395	— 7,274,602
1942	14,411,422	12,015,863	15,598,395	— 3,582,532
1943(B)	5,563,283	28,500,000	24,057,541	+ 4,442,459
1944(C)	2,969,618	51,276,499	30,071,926	+ 21,204,573
1945	6,135,402	110,675,066	58,634,868	+ 52,040,198
1946	13,032,000	58,081,237	52,610,909	+ 5,470,328
1947	25,612,586(D)	21,772,598	33,144,101	— 11,371,503
1948	44,635,623(D)	23,815,519	51,571,220	— 27,755,701
1949	54,554,400(D)	25,695,375	73,418,670	— 47,723,295
1950	56,169,576(D)	27,334,124	78,286,463	— 50,952,339
	$260,489,619	$378,315,992	$457,105,006	—$78,789,014

(A)—Includes costs of field air mail salaries.

(B)—No cost ascertainment report for 1943. Expenses are estimates.

(C)—During war years overseas mail except to South America was carried by Air Transport Command. Sums paid to airlines negligible.

(D)—Adjusted.



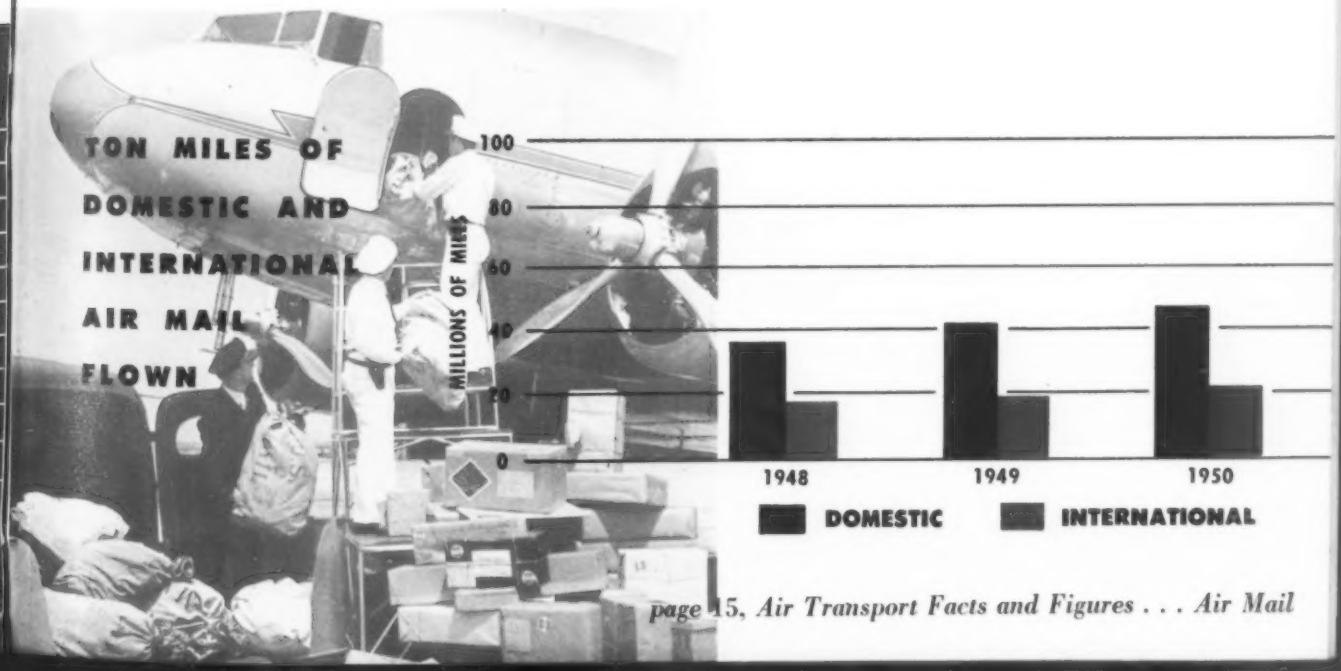
AIR MAIL • MILES AND PAYMENTS

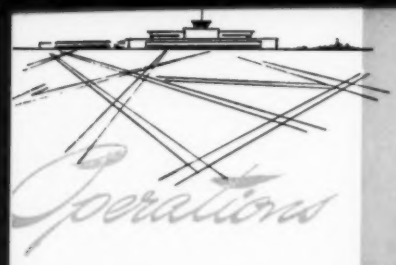
Fiscal Year Ending June 30	DOMESTIC Payments Per Plane Mile	Pound Miles Per Route Mile	Revenue Mail Miles Flown	Route Miles Air Mail Service	Ton Miles Performed	INTERNATIONAL Plane Miles Flown	Payments Per Plane Mile
1939	$.326	426,608	52,141,758	37,080	7,909,309	5,357,405	$1.74
1940	.328	492,090	59,236,453	37,943	9,335,684	5,907,124	2.10
1941	.273	513,579	75,689,839	43,411	11,147,481	8,238,349	1.65
1942	.263	703,768	89,307,567	44,623	15,702,129	8,858,294	1.61
1943	.262	1,251,401	88,963,296	45,304	28,246,170	15,633,483	.36
1944	.264	1,734,022	107,650,804	49,482	42,289,845	19,485,789	.17
1945	.213	2,162,025	166,576,371	56,849	61,454,346	24,275,760	.25
1946	.121	1,772,013	221,724,860	57,377	50,836,389	40,659,256	.27
1947	.069	658,592	314,505,965(A)	102,454	33,737,707(A)	61,213,887	.31
1948	.109	520,562	321,661,665(A)	130,093	33,858,424(A)	91,439,534	.44
1949	.191	531,263	333,245,576(A)	155,314	41,256,760(A)	97,459,137	.62
1950	.190	530,585	339,160,155(A)	158,977	42,175,437(A)	87,809,537	.69

(A)—Subject to adjustment

MAIL TON MILES FLOWN MONTHLY

	DOMESTIC 1948	1949	1950	INTERNATIONAL 1948	1949	1950
January	2,757,163	3,330,170	3,347,435	1,105,852	1,629,104	1,488,208
February	2,637,334	3,246,336	3,261,453	1,131,463	1,447,374	1,421,187
March	3,069,795	3,677,885	3,740,180	1,337,956	1,651,236	1,692,992
April	2,843,869	3,598,234	3,546,090	1,313,260	1,692,416	1,739,571
May	2,955,846	3,364,766	3,799,008	1,308,798	1,572,508	1,868,096
June	2,900,079	3,274,250	3,554,922	1,305,528	1,510,107	1,679,390
July	2,798,491	2,954,599	3,305,024	1,321,279	1,472,381	1,717,127
August	2,926,753	3,159,571	3,833,651	1,278,551	1,463,055	1,738,268
September	3,107,066	3,137,299	3,820,066	1,246,356	1,401,918	1,651,275
October	3,363,773	3,292,972	4,308,109	1,473,950	1,492,467	1,719,793
November	3,401,554	3,357,811	4,168,466	1,709,942	1,497,093	1,791,063
December	5,163,673	5,018,961	6,319,739	2,589,235	2,506,110	2,681,120
TOTAL	37,925,396	41,412,854	47,004,143	17,122,170	19,365,769	21,188,090





Those not close to the light aircraft industry may not realize the volume of private flying far surpasses that of the scheduled air transport industry, despite the fact the scheduled airlines average one takeoff or landing every 8 seconds of the day and night.

Civil Aeronautics Administration statistics reveal that about 60,000 active light aircraft flew 10,980,000 hours in 1949, latest year reported. The CAA figures show that of the light aircraft, 48,000 are used in industry other than commercial aviation itself. Business and professional flying of light aircraft, which is increasing rapidly, in 1949 topped scheduled airline operations hours with a total of 2,600,000 hours. The total hours flown by all light aircraft are about 4 times the 2,500,000 hours reported to be flown by the scheduled airlines in 1949.

As to airport costs, it is pertinent to note that in 1950 the scheduled air transport lines of the U.S. accounted for only 23.6 percent of the landings and take-offs at airports, and in 1951, with increased military flying, this percentage will undoubtedly decrease.

In advocating an improved airways system now being set up, the Congressional Aviation Policy Board said, "The cost of the total system is estimated at $1,113,000,000 and is estimated to take 15 years to complete. Of this total $989,000,000 is chargeable directly to national defense." This is 90% of the cost.

AIRPORTS BY CLASSES, (As of December 31)

Length of Runways	1941	1945	1946	1947(A)	1948(A)	1949(A)	1950(A)
Class I and under (Unpaved 1800-2700 ft.; paved 1800-2500 ft.)	1,523	1,620	2,491	3,525	4,006	4,054	4,005
Class II (Unpaved 2700-3700 ft.; paved 2500-3500 ft.)	702	1,091	758	845	972	994	964
Class III (Unpaved 3700-4700 ft.; paved 3500-4300 ft.)	187	484	485	422	471	501	507
Class IV (Unpaved 4700-5700 ft.; paved 4500-5500 ft.)	72*	488	443	314	361	368	376
Class V (Unpaved 5700-6700 ft.; paved 5500-6500 ft.)	....	343	313	100	131	135	139
Class VI and over (Unpaved 6700-7700 ft.; paved 6500-7500 ft.)	....	....	....	52	75	79	81
TOTALS	2,484	4,026	4,490	5,258	6,016	6,131	6,072

*Class IV and over. (A) Civil Airports only.

USE OF AIRPORTS

Fiscal Year	Number of Flight Operations Military	Civil	Air Carrier	Air Carrier Percentage
1944	8,390,000	3,594,000	916,000	7.1
1945	6,460,567	3,343,303	1,409,102	12.6
1946	2,457,878	5,091,671	2,042,049	21.3
1947	1,402,909	11,262,191	2,630,472	17.2
1948	1,871,413	13,820,525	3,052,781	16.3
1949	2,689,408	11,406,562	3,489,061	19.8
1950	2,485,424	9,884,252	3,834,332	23.66

All figures include LaGuardia Airport which was operated by New York City until October 1, 1946, when CAA took over control towers there.

AIRLINE POINTS

Certified as of 31 December 1950

	Points in Use	Points Not Served	Total Points Authorized
Trunk Lines exclusively	209	30	239
Local service airlines, exclusively	195	184	379
Combination trunk and local service	174	6	180
Cargo, exclusively	5	1	6
TOTAL	583	221	804

ROUTE MILEAGE

As of December 31, 1950

DOMESTIC TRUNK	
American	20,590
Braniff	4,831
Capital	7,372
Catalina	47
Chicago & Southern	6,119
Colonial	1,380
Continental	4,043
Delta	7,580
Eastern	18,304
Hawaiian	386
Inland	1,913
Mid-Continent	6,121
National	2,715
Northeast	2,833
Northwest	11,130
Pan American	38
TWA	16,121
Trans Pacific	374
United	15,806
Western	3,103
TOTAL	130,806
LOCAL SERVICE	
All American	3,368
Air News	429
Bonanza	664
Central	1,345
Empire	754
Frontier	5,278
Helicopter Air	307
Island Air Ferries	227
Lake Central	655
Los Angeles Airways	387
Mid-West	1,280
Ozark	2,488
Piedmont	1,991
Pioneer	1,995
Robinson	568
Southern	2,117
Southwest	1,272
Trans Texas	2,556
West Coast	885
Wiggins	793
Wisconsin Central	1,712
TOTAL	31,071
INTERNATIONAL*	
American Overseas	9,134
Braniff	7,597
Caribbean Atlantic	386
Chicago & Southern	3,270
Colonial	2,030
Eastern	917
National	445
Northwest	15,977
Pan American	127,930
Pan American-Grace	10,653
TWA	23,317
UMCA	382
Western	1,640
TOTAL	203,678
OVERSEAS*	
Eastern	1,040
Northwest	2,736
United	2,400
TOTAL	6,176
TOTALS	
Total Trunk & Local Service	161,877
Total International & Overseas	209,854*
GRAND TOTAL	371,731

* As of December 31, 1949. These figures for 1950 are not yet available.

PERSONNEL

Employment in the scheduled air transport industry in the third quarter of 1950 was more than six times the 13,274 employed in 1938. These figures do not include the 7,400 employees of the Civil Aeronautics Administration who direct traffic at major U.S. airports and provide weather information.

While employment in the air transport industry is spread throughout the country and internationally (for the U.S. flag airlines span five continents), there are noticeable concentrations in New York, California and Florida. In these states there are major air terminals and the major overhaul bases for several of the leading airlines.

In 1949, the latest available year reported, there was a substantial reduction in both frequency and severity of employee accidents.

DOMESTIC AIRLINES

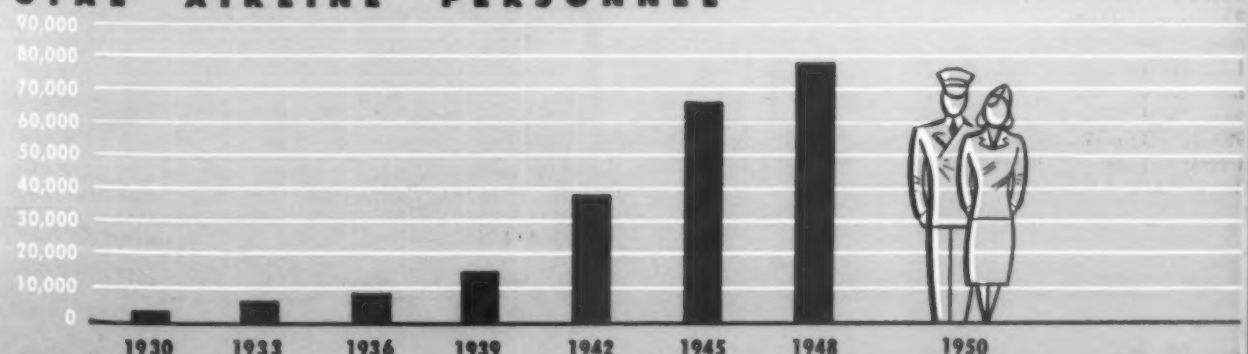
Year	Pilots & Copilots	Pursers Stewards Stewdsses.	Other Flight Personnel	Meteorologists & Dispatchers	Mechanics	Other Hangar and Field Personnel	Ticket Agents and Reservationists, Office Employees	All Others	Total
1941	2,217	1,028	19	220	4,423	2,224	7,807	1,285	19,223
1942	2,194	753	112	1,581	9,348	2,969	7,717	2,236	26,910
1943	2,125	845	8	1,685	8,271	3,356	10,973	2,391	29,654
1944	2,879	1,322	11	1,870	7,136	3,509	12,201	2,270	31,198
1945	4,967	2,075	108	2,613	10,844	7,012	19,241	3,453	50,313
1946	5,712	3,342	98	3,577	16,107	10,307	24,626	5,413	69,182
1947	5,030	3,061	181	2,619	15,372	8,407	21,980	2,348	58,998
1948	5,134	2,975	312	2,791	14,822	9,118	16,864	7,250	59,266
1949	5,101	3,168	642	2,688	14,214	9,393	16,391	7,478	59,075
1950*	5,385	3,201	687	2,635	14,015	9,310	16,872	7,642	59,745

INTERNATIONAL AIRLINES

Year									
1941	447	182	30	0	1,966	2,707	1,903	0	7,235
1942	452	378	129	29	3,534	4,415	3,366	0	12,803
1943	207	147	322	511	2,140	1,835	1,859	2,604	9,625
1944	466	194	266	631	2,827	2,239	3,033	1,753	11,409
1945	930	411	938	864	5,099	2,435	4,663	2,628	17,968
1946	1,508	1,079	1,405	1,454	7,269	2,463	6,961	5,233	27,372
1947	1,603	1,016	1,152	1,211	5,774	3,201	10,679	1,518	26,154
1948	1,532	1,032	1,161	901	4,414	2,899	3,908	4,826	20,673
1949	1,475	1,065	954	870	3,168	2,174	3,476	4,092	17,274
1950*	1,598	937	931	1,108	3,123	2,573	3,758	3,884	17,912

* As of September 30, 1950.
These figures do not include 1 territorial line and 8 local service lines.

TOTAL AIRLINE PERSONNEL



AIRCRAFT UTILIZATION DOMESTIC AIRLINES

SELECTED YEARS		1940		1945		1948*		1949*		1950*	
	No. of Engines	No. Planes	Av. Mi. Per Day	No. Planes	Av. Mi. Per Day	No. Planes	Av. Mi. Per Day	No. Planes	Av. Mi. Per Day	No. Planes	Av. Mi. Per Day
Beechcraft	2	....	....	0.8	66	6.4	648	....	....	....	....
Boeing											
247-D	2	34.9	468	....	....	1.0	818	....	....	....	....
SA-307B	4	3.1	1,354	3.6	2,094	5.0	1,362	5.0	1,365	5.0	656
377	4	....	....	....	....	....	....	10.0	410	10.0	1,283
Consolidated Vultee											
Convair	2	....	....	....	....	16.2	899	93.0	853	103.0	940
Douglas											
DC-2	2	42.2	715	....	....	....	....	....	....	....	....
DC-3	2	145.2	1,198	314.4	1,756	442.4	1,190	398.0	1,077	388.0	972
DST	2	38.6	1,569	....	....	....	....	....	....	....	....
DC-4	4	....	....	....	....	150.8	1,318	160.0	958	150.0	1,324
DC-6	4	....	....	....	....	54.4	1,864	104.0	1,655	111.0	1,751
Lockheed											
Electra	2	33.8	583	1.3	727	3.9	591	....	....	....	....
Lodestar	2	4.4	661	17.7	1,545	12.0	335	11.0	975	11.0	969
Constellation	4	....	....	....	....	32.0	2,067	55.0	1,596	83.0	1,264
Sikorsky	2	6.0	203	2.0	184	....	....	....	....	....	....
Stinson											
Sing. Motor	1	....	....	10.9	404	7.0	447	....	....	....	....
Tri-motor	3	2.0	109	4.0	61	....	....	....	....	....	....
Martin 202	2	....	....	....	....	17.6	859	24.0	1,255	33.0	954
Curtiss 46	2	....	....	....	....	.2	802	2.0	224	....	....

* Includes local service and territorial airlines. 1950 data for 11 months only.

FUEL CONSUMED

INTERNATIONAL AIRLINES

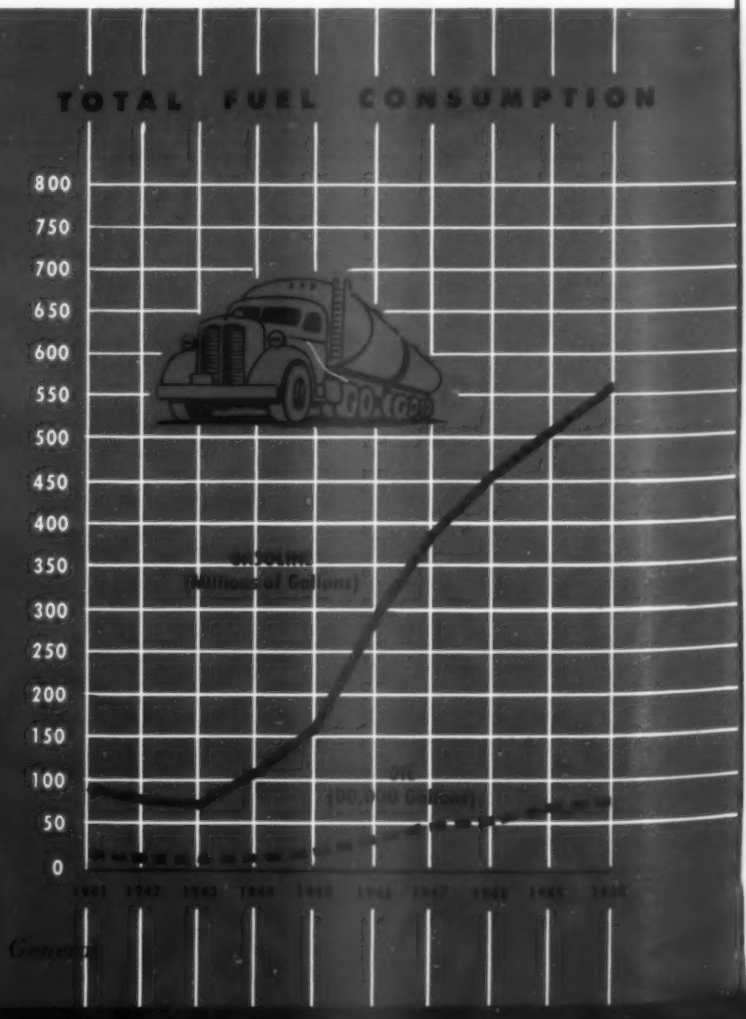
	GASOLINE (Gallons)	OIL (Gallons)
1940	8,860,034	183,518
1941	11,302,376	(A)276,454
1942	16,811,959	(A)329,154
1943	13,760,354	242,577
1944	15,648,426	243,836
1945	25,086,866	315,930
1946	59,543,323	767,569
1947	102,723,690	1,224,810
1948	123,403,583	1,296,952
1949	135,249,475	1,570,239
1950	150,773,414	1,689,919

(A) Estimated

DOMESTIC AIRLINES

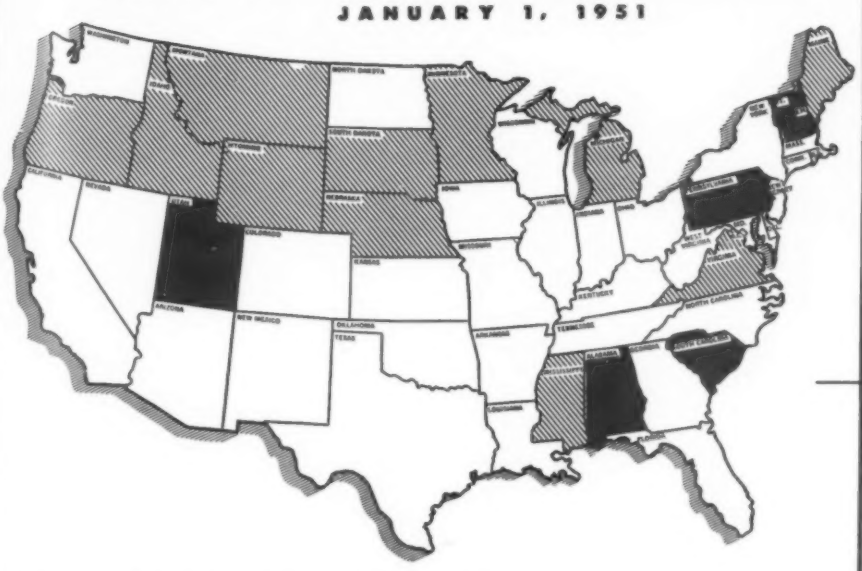
1940	65,674,895	1,104,289
1941	81,657,020	1,282,064
1942	68,908,271	1,008,371
1943	65,025,412	894,262
1944	89,818,648	1,266,741
1945	134,824,120	1,709,566
1946	206,388,751	2,876,250
1947	294,196,130	3,733,728
1948	388,423,553	4,250,151
1949	373,217,684	4,684,766
1950	419,818,504	4,939,903

TOTAL FUEL CONSUMPTION



STATUS OF AVIATION GASOLINE TAXES

JANUARY 1, 1951



Trend in Aviation Fuel Taxes is Down and Out.

Thirty-two states recognize that imposition of a levy on aircraft fuel is neither a sound nor equitable way to tax aviation. These states consider aviation as one of the many non-highway users of gasoline who should not be penalized through such an inequitable assessment.

In the short period between 1945 and 1950 alone, the number of aviation-conscious states was increased by the addition of eight new members: Maine (partial refund, 1947); Nebraska (partial refund, 1947); Ohio (complete exemption, 1947); Oklahoma (complete exemption, 1947); Rhode Island (full refund, 1948); Kansas (full refund, 1949); Tennessee (complete exemption, 1949); and Louisiana (full refund, 1950).

TAX RATES BY STATES

PARTIAL TAX—11

	Basic Tax	Net Tax
Idaho	6¢	2½¢
Maine	6¢	4¢
Michigan*	3¢	1½¢
Minnesota**	4¢	4¢-½¢
Mississippi	7¢	1¢
Montana	6¢	1¢
Nebraska	5¢	2½¢
Oregon***	6¢	1¢
South Dakota****	4¢	4¢-2¢
Virginia*****	6¢	4¢
Wyoming	4¢	2¢

*—*Applies to scheduled carriers only.*

**—*Refund effective after 50,000 gallons, and graduated thereafter from 1¢ to 3½¢.*

***—*Full exemption for gas used in international operations; 5¢ exemption for gas in domestic operations.*

****—*Refund effective after 50,000 gallons; 1¢ from 50,000 to 100,000 and thereafter 2¢ per gallon.*

*****—*Full refund for gas purchased in Virginia and used in operation out of state; refund of 2¢ on gas used in operation within Virginia.*

FULL TAX—6

Alabama	6¢	South Carolina	7¢
New Hampshire	4¢	Utah	4¢
Pennsylvania	5¢	Vermont	5¢

NO TAX—32

Arizona	5¢	Refund
Arkansas	6½¢	Exemption
California	4½¢	Refund
Colorado	6¢	Refund
Connecticut	4¢	Exemption
Delaware	5¢	Refund
Florida	7¢	Exemption
Georgia	7¢	Exemption on storage
Illinois	3¢	Refund
Indiana	4¢	Exemption
Iowa	4¢	Refund
Kansas	5¢	Refund
Kentucky	7¢	Refund
Louisiana	9¢	Refund
Maryland	5¢	Refund
Massachusetts	3¢	Refund
Missouri	2¢	Refund
Nevada	5½¢	Refund
New Jersey	3¢	Refund
New Mexico	7¢	Refund
New York	4¢	Refund
North Carolina	7¢	Exemption
North Dakota	4¢	Refund
Ohio	4¢	Exemption
Oklahoma	6½¢	Exemption
Rhode Island	4¢	Refund
Tennessee	7¢	Exemption
Texas	4¢	Refund
Washington	6½¢	Exemption
West Virginia	5¢	Refund
Wisconsin	4¢	Refund
District of C.	4¢	Refund

AIR TRANSPORT ASSOCIATION OF AMERICA

1107 16th Street, N. W.
Washington, D. C.

Since its foundation 15 years ago, team-work for progress has been the objective of the Air Transport Association of America. It has been first and last a service organization. Its general policies and activities are the expression of the desire for joint action and a united front by its membership. Its activities range from the development of increased safety and more efficient flying, to the study of legislation; from standard design specifications for aircraft, aircraft equipment and ground handling equipment, to economic surveys and analyses of operating costs; from development of better air terminals to the full promotion of air transportation to the public.

Through ATA's 88 employees the experience, ideas, and attainments of the individual airlines are quickly pooled to the advantage of all members. Through ATA the efforts of eight government agencies and four private agencies concerned with aviation are welded into unified action for the benefit of the travelling public, the Postal Service, and the national defense.

The membership of the ATA consists of 38 United States flag airlines and two Canadian airlines. Thirty-seven of the U.S. flag lines are certificated by the Civil Aeronautics Board for scheduled service over regularly established routes. The operations of the U.S. and Canadian carriers are domestic, territorial and international in scope, covering the transportation of passengers, property, and mail by aircraft. Fourteen of the members are local service airlines, which are duly certificated regional carriers.

Officers AIR TRANSPORT ASSOCIATION of AMERICA

Emory S. Land.....*President*
*Robert Ramspeck.....*Executive Vice President*
M. F. Redfern.....*Vice President—Traffic, and Secretary*
Milton W. Arnold..*Vice President—Operations & Engineering*
Stuart G. Tipton.....*General Counsel*
Joseph F. Hintersehr.....*Treasurer*

*On leave of absence in Government service effective March 15, 1951.

Members

Alaska Airlines Stanley J. McCutcheon, *Pres.*
501 Fifth Avenue, New York, N.Y.

†**All American Airways, Inc.** Robert M. Love, *Pres.*
National Airport, Washington 1, D.C.

American Airlines, Inc. C. R. Smith, *Pres.*
100 Park Ave., New York 17, N.Y.

†**Bonanza Air Lines, Inc.** Edmund Converse, *Pres.*
P.O. Box 391, Las Vegas, Nevada

Braniff International Airways, Inc. T. E. Braniff, *Pres.*
Love Field, Dallas 19, Texas

*†**Canadian Pacific Air Lines, Ltd.**
G. W. G. McConachie, *Pres.*
Sea Island Airport, Vancouver, AMF, B.C. Canada

Capital Airlines, Inc. J. H. Carmichael, *Pres.*
National Airport, Washington 1, D.C.

*†**Caribbean-Atlantic Airlines, Inc.** Dionisio Trigo, *Pres.*
P.O. Box 3214, San Juan, Puerto Rico

†**Central Airlines, Inc.** Keith Kahle, *Pres.*
6109 Camp Bowie Blvd., Fort Worth, Texas

Chicago & Southern Air Lines, Inc. S. A. Stewart, *Pres.*
Memphis Municipal Airport, Memphis 2, Tenn.

Colonial Airlines, Inc. Sigmund Janas *Pres.*
230 Park Ave., New York 17, N.Y.

Continental Air Lines, Inc. Robert F. Six, *Pres.*
Stapleton Airfield, Denver 7, Colorado

Delta Air Lines, Inc. C. E. Woolman, *Pres.*
Municipal Airport, Atlanta, Ga.

Eastern Air Lines, Inc. E. V. Rickenbacker, *Pres.*
10 Rockefeller Plaza, New York 20, N.Y.

†**Empire Air Lines, Inc.** Joe Lux, *Pres.*
Box 268, Gowan Field, Boise, Idaho

†**Frontier Airlines, Inc.** H. S. Darr, *Pres.*
Stapleton Airfield, Denver 7, Colorado

Hawaiian Airlines, Ltd. Stanley C. Kennedy, *Pres.*
P.O. Box 3287, Honolulu 1, T.H.

Inland Air Lines, Inc. T. C. Drinkwater, *Pres.*
6060 Avion Drive, Los Angeles 45, Calif.

†**Lake Central Airlines, Inc.** Col. Roscoe Turner, *Pres.*
Weir Cook Airport, Indianapolis 44, Indiana

Mid-Continent Airlines, Inc. J. W. Miller, *Pres.*
102 E. 9th Street, Kansas City 6, Mo.

National Airlines, Inc. G. T. Baker, *Pres.*
3240 N.W. 27th Ave., Miami 42, Florida

Northeast Airlines, Inc. George E. Gardner, *Pres.*
239 Prescott St., East Boston 28, Mass.

Northwest Airlines, Inc. Croil Hunter, *Pres.*
1885 University Ave., St. Paul 1, Minn.

†**Ozark Air Lines, Inc.** Laddie H. D. Hamilton, *Pres.*
Suite 209, 408 Oliver St., St. Louis, Mo.

Pacific Northern Airlines, Inc. A. G. Woodley, *Pres.*
Anchorage, Alaska

*†**Pan American-Grace Airways, Inc.** Andrew B. Shea, *Pres.*
Chrysler Building, New York 17, N.Y.

Pan American World Airways, Inc. Juan T. Trippe, *Pres.*
Chrysler Building, New York 17, N.Y.

†**Piedmont Airlines** T. H. Davis, *Pres.*
Smith Reynolds Airport, Winston-Salem 1, N.C.

†**Pioneer Air Lines, Inc.** Gen. Robert J. Smith, *Pres.*
P.O. Box 7065, Dallas 9, Texas

Resort Airlines, Inc. L. C. Burwell, Jr., *Pres.*
Resort Field, Pinehurst, N.C.

†**Robinson Airlines Corp.** E. Victor Underwood, *Pres.*
Seneca Building, Ithaca, New York

†**Southern Airways, Inc.** Frank W. Hulse, *Pres.*
Municipal Airport, Birmingham 6, Ala.

†**Southwest Airways Co.** John H. Connelly, *Pres.*
Box 268, South San Francisco, California

*†**Trans-Canada Air Lines** Gordon R. McGregor, *Pres.*
1080 University St., Montreal, P.Q. Canada

*†**Trans-Pacific Airlines, Ltd.** Ruddy F. Tongg, *Pres.*
Box 2113, Honolulu, T.H.

†**Trans Texas Airways** R. E. McKaughan, *Pres.*
Municipal Airport, Houston, Texas

TWA—Trans World Airline, Inc. Ralph S. Damon, *Pres.*
60 East 42nd St., New York 17, N.Y.

United Air Lines, Inc. W. A. Patterson, *Pres.*
5959 S. Cicero Ave., Chicago 38, Ill.

Western Air Lines, Inc. T. C. Drinkwater, *Pres.*
6060 Avion Drive, Los Angeles 45, Calif.

†**Wisconsin-Central Airlines, Inc.** Francis M. Higgins, *Pres.*
Municipal Airport, Madison, Wisconsin

*—Associate Member
†—Local Service Airline

American Aviation

1025 Vermont Avenue N. W.,
Washington 5, D. C.

AMERICAN AVIATION is honored to present the Air Transport Association's 12th Annual Edition of "Facts and Figures" about the U. S. scheduled certificated airlines. These Facts and Figures, assembled by ATA from revised data filed by the carriers with the Civil Aeronautics Board, show significant development and progress of the air transport industry throughout the years.

MID-CONTINENT AIRLINES

Serving the Heart of America

December 27, 1950

Surface Combustion Corporation
2375 Dorr Street
Toledo 1, Ohio

Gentlemen:

At the time we placed our Convair aircraft in service last Spring, we recognized the problem of inadequate cockpit heat and the need for heating the cabins on the ground; therefore, a decision was made to install 'Janitrols', as we considered such an installation to be the most logical solution to our problem.

Since completing the installations in our fleet of Convairs, we have operated in temperatures far below zero, both on the ground and in the air, and have found the Janitrols equal to all occasions. Our Convair cockpits are warm and cabins may be heated to a comfortable temperature before boarding passengers, regardless of outside air temperatures.

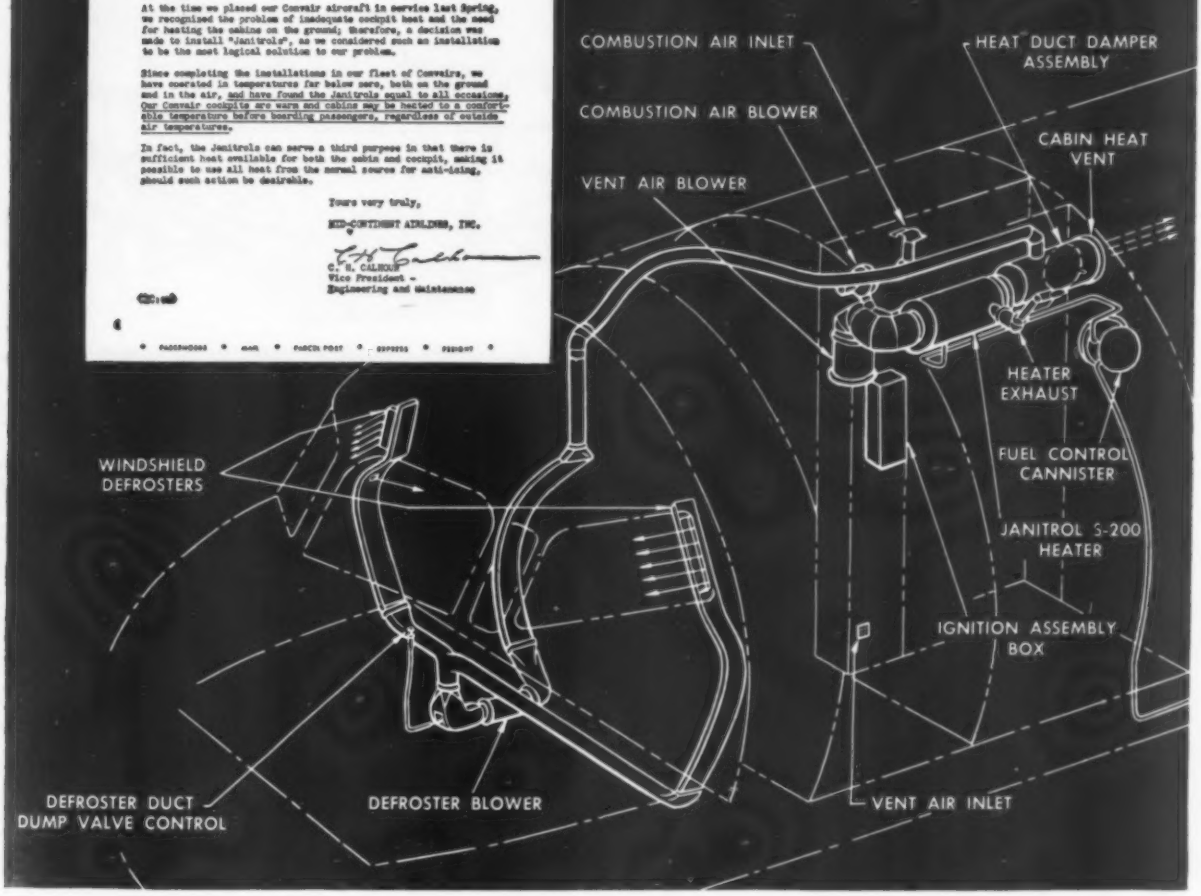
In fact, the Janitrols can serve a third purpose in that there is sufficient heat available for both the cabin and cockpit, making it possible to use all heat from the normal source for anti-icing, should such action be desirable.

Yours very truly,

MID-CONTINENT AIRLINES, INC.

C. B. CALHOUN
Vice President -
Engineering and Maintenance

"..equal to all occasions"



". . . and thanks from the pilots."

Re Janitrol heating equipment on Mid-Continent Convairs, Captain L. Homer Mouden wrote in his log book: "It is really a comfort and a joy to have heat in the cockpit. This is the best arrangement of our CV-240 fleet . . . and thanks from the pilots." Thanks to you, Mid-Continent, for a heart-warming testimonial.

AIRCRAFT AND AUTOMOTIVE HEATERS *with the whirling flame*

Janitrol®

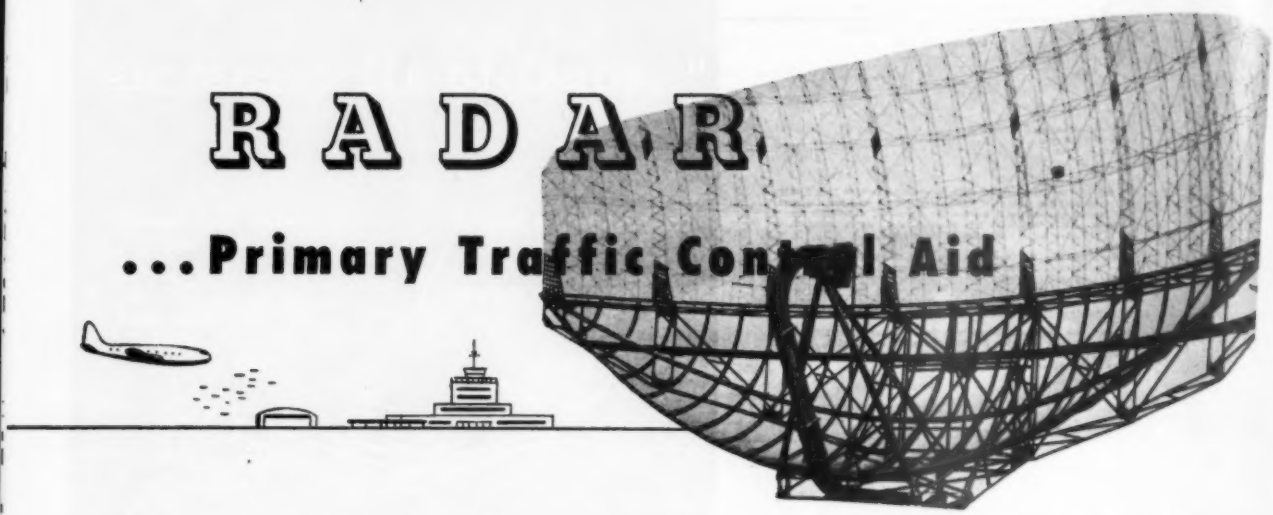
KNOWN THE WORLD 'ROUND

AIRCRAFT-AUTOMOTIVE DIVISION • SURFACE COMBUSTION CORP., TOLEDO 1, OHIO

F. H. Scott, New York, N. Y., 225 Broadway; C. B. Anderson, Kansas City, Mo., 1438 Dierks Building; Lee Curtin, Hollywood, Calif., 7046 Hollywood Blvd., Frank Deak, P. A. Miller, Central District Office, Engineering Development and Production, Columbus, Ohio; Headquarters, Toledo, Ohio

RADAR . . .

. . . Primary Traffic Control Aid



By WILLIAM D. PERREAULT

LAST year was a period of re-examination in matters relating to air navigation and traffic control —the so called Common System for civil and non-tactical military use. The re-examination was effective and healthy.

As the agency charged with maintaining the Federal Airways, the Civil Aeronautics Administration's budget carries the bulk of money spent in buying, installing and maintaining ground equipment for use in air traffic control and navigation. The master guide used in dictating the direction of CAA's effort has been the SC-31 report of the Radio Technical Commission for Aeronautics.

Because of its civil and military importance and because it was a unanimous industry program, appropriations to supplement the SC-31 report have had relatively easy sledding. The situation is now changing in the light of heavy national defense spending which has made cuts in some areas necessary.

New Emphasis

The result is that emphasis will now be placed on projects which are well advanced or of prime military importance.

This is reflected in the $6,117,000 cut in funds for the Air Navigation Development Board, which is basically devoted to research into equipment for the target system still 10 years in the future.

The common system program will suffer from this major reduction in development funds, but it is a voluntary cut originated by the Secretaries of Defense and Commerce.

The total of $256.7 million in equipment projected by SC-31 has been reduced to $119.5 million.

The 350 instrument landing systems and equal number of high intensity runway light installations have been reduced to a CAA projected 180; precision approach and airport surveillance radar were virtually halved. Yet this was not an indiscriminate, across the board cutting for economies alone. Omnidirectional radio range requirements have been projected upward from 466 to 500 and VHF/ADF equipment went from 172 under SC-31 to 243 to meet growing demand.

Based on '48 Data

The SC-31 document was a guide based on the best information available in 1948. It gave the direction needed to the divergent efforts being expended by civil and military agencies as well as the industry as a whole. SC-31 did not attempt to outline how its recommendations should be implemented. Most of the equipment now considered mandatory was still under development at the time SC-31 completed its report and many conflicting views existed on the specific equipment which appeared to be beyond compromise.

In 1950, with newly gained operational experience using precision approach and surveillance radar, ILS operations at lower minimums, mounting use of VOR ranges, etc., the industry was prepared to make up its mind on the equipment to be used in accomplishing the targets set by SC-31.

In the Navigation Panel of the Air Coordinating Committee, under chairman Charles F. Horne, a special Operational Policy Group, known as Working Group 5, was established to put definition in the SC-31 report. The NAV Panel, which established SWG 5, consists of voting membership by the U. S. Air Force, Civil Aeronautics Board, Dept. of Commerce, Navy, Treasury, and the Federal Communications Commission.

Also, non-voting membership in the NAV Panel includes the Air Line Pilots Association, Aircraft Owners and Pilots Association, Air Transport Association, and Airport Operators Committee. It is evident that the full cross section of civil and military aviation is represented in the establishment of SWG 5.

Activated on Feb. 16, 1950, under the chairmanship of Commander A. W. Wuerker, USCG, the operational policy group accomplished a monumental task between that date and December when the final report "Air Traffic Control and the National Security" was unanimously adopted. This report gives definition to the SC-31 recommendations. In essence it amounts to a new SC-31 report based on the initial recommendations but with many of the "blanks" filled in on the basis of the improved state of the art in 1950.

First Radar Control Center

"Air Traffic Control and the National Security" is a 150-page report which in itself is a summary of thousands of pages of reports compiled by experts in each of the related fields represented in SWG 5 committees.

Probably the most important decision of SWG 5 was that establishing radar as the primary traffic control facility with all other equipment and procedures used to supplement radar and best serve the radar controller. In accordance with the report's recommendations Washington National Airport is now being equipped as the first radar control

WILCOX...

CHOICE OF TWA

WILCOX TYPE 96D TRANSMITTERS CHOSEN FOR *TWA's* GROUND STATION INSTALLATION

AT ROME

TWA's far-flung empire requires the finest communications network that research and precision manufacturing can produce. TWA has long been a user of Wilcox equipment, and Wilcox is proud to be chosen again as TWA expands and improves its world-wide services. The Wilcox Type 96D 2500 watt transmitter covers the 2-26 mc. range.

UNIT CONSTRUCTION OFFERS OPERATING FLEXIBILITY

Either simultaneous transmission on several frequencies or the selection of an individual frequency best suited to your particular problem.

JAN COMPONENT STANDARDS FOR DEPENDABILITY

All components meet the latest JAN specifications. This means maximum resistance to wear, corrosion, humidity, fungus, temperature, and time.

Write Today for complete information and specifications on the Wilcox 96D Transmitting Station.

WILCOX
ELECTRIC COMPANY
Fourteenth & Chestnut
KANSAS CITY 1, MISSOURI, U.S.A.

center meeting the equipment needs established by the SWG 5 and proved in operation during trials conducted at Wright-Patterson Air Force Base in November.

There are perhaps 12 terminals in the U. S. which now have enough traffic to justify such a radar center. Since these high density airports handle a large percentage of all civil traffic, the effect of these centers on airline regularity will be much more impressive than the numerical total would indicate.

Major characteristics of the equipment proposed by Special Working Group 5 include:

• **Aim is at keeping bulk of equipment** on the ground providing greater acceptance by the commercial weight-conscious operators and providing a better class of service to light plane operators than would otherwise be possible.

• **Designed to make existing equipment** so that no ground will be lost in the transition from current to future standards.

• **Equipment is so arranged** that it can be implemented in stages as the requirements and/or the appropriations are established.

The current status of equipment actually delivered from the manufacturer or already ordered and scheduled for installation in the near future is listed in the chart below, based on CAA data. The chart shows a city by city listing of the approach and surveillance radar installations, instrument landing systems, mechanical interlock equipment and high intensity approach lights.

Not shown in these charts are the omni-directional radio ranges which are now installed and commissioned at 339 locations in the U. S. There are another 28 omni-ranges operating but not commissioned, and 52 underway. Also not shown are the distance measuring equipment installations. At the end of 1950 no DME installations were commissioned.

It is worthy of note that 1950 saw the commissioning of the first complete omni-range airway, paralleling the routes of Continental Air Lines.

In July of 1951 CAA plans on having the first complete VHF airway installation, including distance measuring equipment, in operation. This will be the Chicago-New York airway. CAA had only one DME station operable in March of this year, none commissioned but 438 underway.

Complete Airport Listing of Traffic Control and Landing Aids

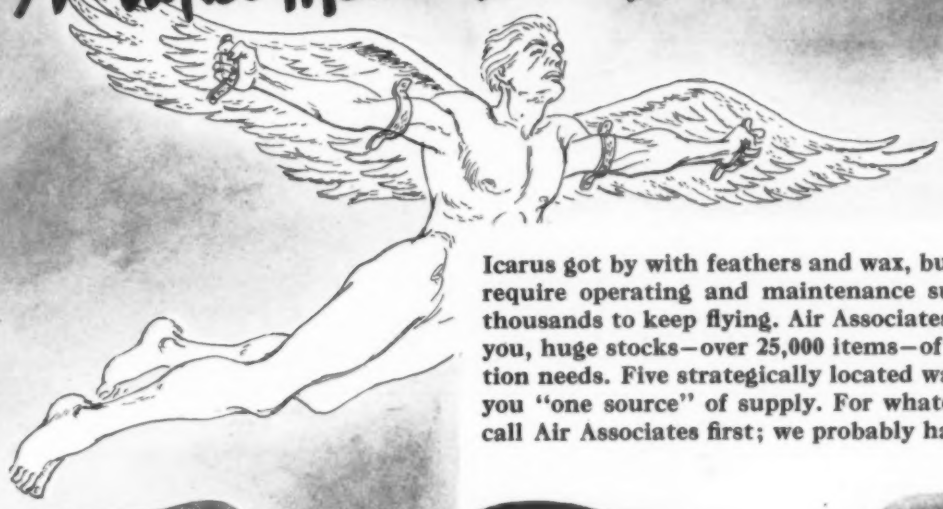
Continental U. S.

City & (Airport)	Instrument Landing System	Airport Surveillance Radar	Precision Approach Radar	Mechanical Interlock ***	High-Intensity Approach Lights	
					Type	Date
Abilene, Tex. (Municipal)	DOCAI					
Akron, O. (Akron-Canton)	7-1-48					
Albany, N. Y. (Municipal)	6-51*					
Albuquerque, N. M. (Kirtland AFB)	1-11-47			6-51*		
Allentown, Pa. (Bethlehem-Easton)	DOCAI					
Amarillo, Tex. (Air Terminal)	2-7-47					
Arcata, Calif. (Municipal)	6-1-50 (Interim Basis)				S.L. 3000	7-1-50
(Municipal)	4-51*					
Atlanta, Ga. (Municipal)	11-24-49	ASR-1 10-15-50	PAR-1 10-15-50	3-51*	LRL 1700	1-20-51
Atlantic City, N. J. (Atlantic City NAS)	1-52*					
Augusta, Ga. (Bush)	1-26-51					
Austin, Tex. (Robert Mueller)	7-26-47					
Bakersfield, Calif. (Kern County)	4-18-47					
Baltimore, Md. (Friendship International)	9-13-50	ASR-3		10-51*	LRL 2000	4-51*
Baton Rogue, La. (Harding)	6-51*					
Beaumont, Tex. (Jefferson County)	1-52*					
Bedford, Mass. (Hanscom)	8-13-48					
Bellingham, Wash. (Municipal)	1-52*					
Billings, Mont. (Municipal)	10-26-46					
Binghamton, N. Y. (Broome County)	8-51*					
Birmingham, Ala. (Municipal)	2-16-48	ASR-2		4-51*	LRL 3000	4-51*
Bismarck, N. D. (Municipal)	12-9-47					
Boise, Idaho (Air Terminal)	1-23-48					
Boston, Mass. (Logan Int'l)	11-15-50	ASR-3 9-28-50	PAR-1 11-15-50	3-1-50	LRL 1900	Indef.
Bristol, Tenn. (Tri-City)	12-17-49					
Brownsville, Tex. (Int'l)	11-30-46					
Buffalo, N. Y. (Municipal)	5-28-47	ASR-3		9-28-50		
Burbank, Calif. (Lockheed Air Terminal)	7-51*	ASR-3			LRL 2870	10-51*
Burlington, Vt. (Municipal)	6-51*					
Casper, Wyo. (Natrona County)	7-51*					
Charlestown, S. C. (Municipal)	12-18-46					
Charleston, W. Va (Kanawha County)	5-51 OWGS					
Charlotte, N. C. (Douglas)	8-10-49	ASR-3				
Chattanooga, Tenn. (Lovell)	6-51*					
Cheyenne, Wyo. (Municipal)	7-26-47					
Chicago, Ill. (Midway)	4-30-47	ASR-1 9-21-50	PAR-1 5-15-50	5-51*	LRL 1500	3-4-50
(Int'l)	11-4-47			5-51*		
Cincinnati, O. (Greater Cincinnati)	1-10-47	ASR-2		4-51*		

NOTE: See bottom of page 70 for explanation of symbols.

Continued on page 68

It takes More than Feathers today!

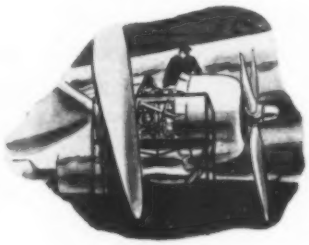


Icarus got by with feathers and wax, but planes today require operating and maintenance supplies by the thousands to keep flying. Air Associates has them for you, huge stocks—over 25,000 items—of everyday aviation needs. Five strategically located warehouses offer you "one source" of supply. For whatever you need, call Air Associates first; we probably have it in stock!

Saturday night, airline style. This bath and polish requires solvents, paints, polishes and waxes—and Air Associates has them for you.

No feathers on this tail. It needs cables, turnbuckles, bushings and other parts to keep working. Air Associates has these, too!

Icarus didn't need tires, tubes or brakes, but airlines do. Let Air Associates be your warehouse for these items.



Engines need hundreds of hoses, clamps, fittings, switches, wires and other items for routine maintenance. You can get them at Air Associates!

Seat belts, ash trays and oxygen equipment for safety and comfort are supplied by Air Associates for airlines everywhere.

Icarus didn't need an altimeter, or a computer; but airlines rely on Air Associates for navigation equipment, instruments, fuses, bulbs, and other items used "up front"!

Air Associates
INCORPORATED

AIR ASSOCIATES INC.

CHICAGO	DALLAS	TETERBORO	GLENDALE	MIAMI
Illinois	Texas	New Jersey	California	Florida

SERVING THE NATION IN AVIATION

Airport Landing Aids

(Continued from page 66)

	Instrument Landing System	Airport Surveillance Radar	Precision Approach Radar	Mechanical Interlock •••	High-Intensity Approach Lights	
					Type	Date
Cleveland, O. (Municipal)	3-28-48	ASR-1	PAR-1	5-51*	Westinghouse	
		9-5-50	9-5-50		1650	9-25-50
Colorado Springs, Colo. (Peterson)	4-51*				LRL 3000	10-51*
Columbia, S. C. (Municipal)	6-51*					
Columbus, Ga. (Muscogee County)	DOCAI					
Columbus, O. (Port Columbus)	1-7-49	ASR-2				
Corpus Christi, Tex. (Cliff Maus)	DOCAI	ASR-3				
Dallas, Tex. (Love)	2-3-47	ASR-2	PAR-2	4-51*	LRL 3000	5-51*
Dayton, O. (Municipal)	7-31-46	ASR-3				
Denver, Colo. (Stapleton)	7-11-46	ASR-2				
Des Moines, Ia. (Municipal)	11-5-47					
Detroit, Mich. (Wayne Major) 9-51*	DOCAI					
(Willow Run)	7-31-47	ASR-2	PAR-2	5-51*	LRL 3000	1-19-51
El Paso, Tex. (Int'l)	3-4-47					
Erie, Pa. (Port Erie)	6-20-47					
Eugene, Ore. (Mahlon Sweet)	12-20-46					
Evansville, Ind. (Municipal)	6-51*					
Everett, Wash. (Paine)	Dep. on USAF plans					
Fargo, N. D. (Municipal)	4-1-49					
Flint, Mich. (Bishop)	7-51*					
Ft. Smith, Ark. (Municipal)	7-51*					
Ft. Wayne, Ind. (Baer)	3-12-49					
Ft. Worth, Tex. (Int'l) 8-51*	DOCAI	ASR-3		4-51*		
(Meacham)	12-23-46					
Fresno, Calif. (Air Terminal)	6-14-49					
Grand Junction, Colo. (Walker)	2-20-46					
Great Falls, Mont. (Municipal)	6-51*					
Greensboro, N. C. (High Point)	6-51*					
Greenville, S. C. (Municipal)	1-52*					
Harrisburg, Pa. (State)	DOCAI	ASR-3				
Houston, Tex. (Municipal)	6-13-47	ASR-2	PAR-2		LRL 3000	1-1-51
Huron, S. D. (Municipal)	1-52*					
Indianapolis, Ind. (Weir Cook)	6-15-46	ASR-2	PAR-2			
Islip, N. Y. (MacArthur)	5-14-48					
Jackson, Miss. (Hawkins)	3-20-47					
Jacksonville, Fla. (Imeson)	3-13-47	ASR-2		5-51	•	
Joplin, Mo. (Municipal)	6-51*					
Kansas City, Mo. (Municipal)	5-16-47	ASR-2	PAR-2	4-51* 2 Circuits	LRL 3000	10-51*
Knoxville, Tenn. (McGhee-Tyson)	11-22-46	ASR-3			LRL 3000	Indef.
Lake Charles, La. (Municipal)	DOCAI by USAF					
Lansing, Mich. (Capital City)	1-52*					
Lincoln, Neb. (Municipal)	6-51*					
Little Rock, Ark. (Adams)	1-52*					
Long Beach, Calif. (Municipal)	3-11-48	ASR-3				
Los Angeles, Calif. (Int'l)	6-25-47	ASR-1	PAR-1	8-28-50	S.L. 3600	1-18-50
		6-15-50	6-15-50			
Louisville, Ky. (Standiford)	11-15-47	ASR-3			LRL 2800	4-51*
Lubbock, Tex. (Municipal)	7-51*					
Macon, Ga. (Cochran)	1-52*					
Madison, Wis. (Municipal)	7-51*					
Medford, Ore. (Municipal)	1-52*					
Memphis, Tenn. (Municipal)	11-26-46	ASR-2		4-51*		
Meridian, Miss. (Key)	3-31-49					
Miami, Fla. (Int'l)	3-4-49					
Midland, Tex. (Air Terminal)	7-15-49					
Milwaukee, Wis. (General Mitchell)	2-25-49					
Minneapolis, Minn. (St. Paul Int'l)	3-6-51	4-51* Mil. type; ASR-2 later	4-51* Mil. type	4-51*	LRL 3000	3-6-51
Mobile, Ala. (Bates)	6-51*					
Moline, Ill. (Quad City)	4-4-50					
Monroe, La. (Selman)	6-51*					
Montgomery, Ala. (Dannelly)	DOACI	ASR-3				
Nashville, Tenn. (Berry)	10-15-48	ASR-3		4-51*	LRL 2100	4-51*
Newark, N. J. (Municipal)	2-19-47	Interim 4-51*; ASR-2 later	Interim 4-51*; PAR-2 later	8-30-50	LRL 2800 Also ALPA 3000	3-24-50 3-51*
New Bedford, Mass. (Municipal)	8-30-49		PAR-2			
New Orleans, La. (Moisant Int'l)	5-15-47	ASR-2		6-51*	LRL 3000	4-51*

NOTE: See bottom of page 70 for explanation of symbols.

Continued on page 70

A hen should do so good!

Hens are notoriously inaccurate—they lay their eggs *anywhere*.

But not the high-flying B-36.

The world's largest bomber consistently drops its load on target—even when flying full-speed at better than 40,000 feet.

One important reason for this precision is a special adaptation of the Honeywell Autopilot. Coupled with the bombsight, the Autopilot corrects for the slightest deviations in pitch, roll and yaw axes—holds the B-36 rock-steady throughout its bombing run.

That's just one of the many special jobs which Honeywell *automatic controls* are performing for the aircraft industry. We expect to do many more in the years to come—because *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

Aeronautical Division
Minneapolis-Honeywell, Minneapolis 8, Minn.

MINNEAPOLIS
Honeywell
Aeronautical Controls

Airport Landing Aids

(Continued from page 68)

	Instrument Landing System	Airport Surveillance Radar	Precision Approach Radar	Mechanical Interlock ***	High-Intensity Approach Lights	
					Type	Date
New York, N. Y. (Int'l)	6-4-49	ASR-1	PAR-1	11-20-50	LRL 3000	11-9-49
		2-15-51	2-15-51			
(LaGuardia)	6-21-46	ASR-1	PAR-1	5-1-50	LRL 1500	Indef.
		5-31-50	5-31-50	2 Circuits		
Niagara Falls, N. Y (Municipal)	5-18-49					
Norfolk, Va. (Municipal)	5-21-48	ASR-2				
Oakland, Calif. (Municipal)	3-6-47	ASR-2	PAR-2	5-51*	LRL 1500	3-8-51
Oklahoma City, Okla. (Will Rogers)	6-19-47	ASR-3			LRL 3000	10-51*
Omaha, Neb. (Municipal)	9-24-50					
Ontario, Calif. (Int'l)	7-51*					
Orlando, Fla. (Municipal)	1-52*					
Pendleton, Ore. (Municipal)	7-51*					
Pensacola, Fla. (Municipal)	1-52*					
Philadelphia, Pa. (Int'l)	6-11-47	ASR-2	PAR-2	8-17-50	LRL 3000	8-51*
Phoenix, Ariz. (Sky Harbor)	6-8-48	Scheduled to be decommissioned.				
Pittsburgh Pa. (Allegheny County)	11-20-49					
(Greater Pittsburgh)	11-51*	DOCAI	ASR-2	PAR-2	10-31-50	
Pocatello, Id. (Phillips)	1-52*					
Portland, Ore. (Municipal)	3-28-47	ASR-2	PAR-2		LRL 3000	10-51*
Providence, R. I. (T. F. Greene)	DOCAI	ASR-3				
Quincy, Ill. (Baldwin Quincy)	1-52*					
Raleigh, N. C. (Raleigh-Durham)	11-22-46					
Reading, Pa. (Municipal)	6-30-47					
Richmond, Va. (Byrd)	9-9-48			10-51*		
Rochester, N. Y. (Municipal)	2-52*					
Rock Springs, Wyo. (Municipal)	10-11-47					
Sacramento, Calif. (Municipal)	4-51*					
Salem, Ore. (McNary)	7-51*					
St. Joseph, Mo. (Rosecrans)	1-15-48					
St. Louis, Mo. (Lambert)	6-25-47	ASR-2	PAR-2	5-51*	LRL 2500	3-51*
Salt Lake City, Utah (Municipal)	12-6-46	ASR-2		11-28-50		
San Antonio, Tex. (Municipal)	1-7-47	ASR-3		6-51*		
San Diego, Calif. (Montgomery)	DOCAI	ASR-3**				
San Francisco, Calif. (Municipal)	2-27-48	ASR-2	PAR-2	3-51*	LRL 3000	10-51*
Santa Barbara, Calif. (Municipal)	6-51*					
Sault Ste. Marie, Mich. (Kinross)	4-25-50					
Savannah, Ga. (Travis)	6-51*					
Seattle, Wash. (Seattle-Tacoma)	3-16-47	ASR-2	PAR-2	4-51*	LRL 1500	4-51*
Shreveport, La. (Municipal)	1-52*	ASR-3				
Sioux City, Ia. (Municipal)	1-52*					
Sioux Falls, S. D. (Municipal)	7-51*					
South Bend, Ind. (Bendix)	5-3-48					
Spokane, Wash (Geiger)	2-23-48					
Syracuse. N. Y. (Hancock)	9-20-49					
Tallahassee, Fla. (Dale Mabry)	9-3-47					
Tampa, Fla. (Int'l)	2-3-48					
Teterboro, N. J. (Teterboro)	6-15-49					
Topeka, Kans. (Philip Billard)	12-1-48					
Tulsa, Okla. (Municipal)	1-21-47	ASR-3				
Washington, D. C. (Washington Nat'l)	10-23-45	ASR-1	PAR-1	12-19-50	S.L. 3000	5-30-50
		1-10-51	1-10-51	2 Circuits		
Wheeling, W. Va. (Ohio County)	6-51*					
White Plains, N. Y. (Westchester County)	4-9-48					
Wichita, Kans. (Municipal)	4-11-47					
Wilkes-Barre. Pa. (Scranton)	5-51*	OWGS				
Wilmington, Del. (New Castle County)	5-51*	OWGS				
Wilmington, N. C. (New Hanover County)	1-52*					
Windsor Locks, Conn. (Bradley)	9-18-47					
Winston Salem, N. C. (Smith Reynolds)	6-51*					
Worcester, Mass. (Municipal)	1-10-49					
Youngstown, O. (Municipal)	6-51*					

* Estimated.

** Dependent on the development of Montgomery Field.

*** Each mechanical interlock installation listed here is coupled to the Air Route Traffic Control Center in the related area.

DOCAI—Dependent on completion of airport improvements

OWGS—Operating without glide slope

L.R.L.—Left row ladder

ALPA—Air Line Pilots system

S.L.—Slope Line.

—1 - - - Gilfillan Brothers
—2 - - - General Electric
—3 - - - Bendix Aviation

Domestic Airports Approved For 200-½ Minimums

As part of the all-weather program, a total of 52 domestic airports have been equipped with Instrument Landing Systems and have been approved by CAA for operations with 200-ft. ceiling and one-half mile visibility. Four are similarly approved for GCA operations.

ILS

City	Airport
Akron, O.	Akron-Canton
Albuquerque, N. M.	Kirtland
Amarillo, Texas	Air Terminal
Arcata, Calif.	Humboldt County
Atlanta, Ga.	Municipal
Bismarck, N. D.	Municipal
Boise, Idaho	Boise Air Terminal
Boston, Mass.	Logan
Brownsville, Texas	Rio Grande Valley Int'l
Buffalo, N. Y.	Buffalo Mun.
Charleston, S. C.	Municipal
Charlotte, N. C.	Douglas
Cheyenne, Wyo.	Municipal
Chicago, Ill.	O'Hare Int'l
Covington, O.	Greater Cincinnati
Dallas, Texas	Love Field
Dayton, Ohio	Dayton
Denver, Colo.	Stapleton Airfield
Detroit, Mich.	Willow Run
El Paso, Texas	Anderson (Municipal)
Houston, Texas	Municipal
Indianapolis, Ind.	Weir Cook Mun.
Jackson, Miss.	Municipal
Jacksonville, Fla.	Imeson
Knoxville, Tenn.	McGhee-Tyson
Los Angeles, Calif.	Los Angeles Int'l
Louisville, Ky.	Standiford
Memphis, Tenn.	Municipal
Miami, Fla.	Miami Int'l
Midland-Odessa, Texas	Midland Air Terminal
Milwaukee, Wis.	General Mitchell
Minneapolis, Minn.	Minneapolis-St. Paul Int'l
Moline, Ill.	Quad-City
Newark, N. J.	Municipal
New Bedford, Mass.	Municipal
New Orleans, La.	Moisant Int'l
New York, N. Y.	New York Int'l
Oklahoma City, Okla.	Will Rogers
Raleigh, N. C.	Raleigh-Durham
Richmond, Va.	Byrd Field
St. Joseph, Mo.	Rosecrans
St. Louis, Mo.	Lambert
San Antonio, Texas	Municipal
Seattle, Wash.	Seattle-Tacoma Int'l
Spokane, Wash.	Geiger Field
Syracuse, N. Y.	Hancock
Tallahassee, Fla.	Dale Mabry
Tampa, Fla.	Tampa Int'l
Tulsa, Okla	Municipal
Washington, D. C.	Washington Nat'l
Wichita, Kans.	Municipal
Windsor Locks, Conn.	Bradley Field (State)

GCA

City	Airport
Boston, Mass.	Logan
Fairfield-Suisun, Calif.	Travis AFB
Los Angeles, Calif.	Los Angeles Int'l
Washington, D. C.	Washington Nat'l

Recently, Bendix Airport Surveillance Radar and Precision Approach Radar equipment (the two major components of Bendix G.C.A.) was selected by the C.A.A. for installation at *34 major U. S. airports*. Thus, another milestone was added to a record of leadership in this field begun years ago when Bendix *pioneered* radar. Later, Bendix engineers collaborated with the Radiation Laboratory at the Massachusetts Institute of Technology in the development of the *first* G.C.A. equipment. Since that time, Bendix G.C.A. has been guiding planes in to safe landings at military and civil air fields all over the world. If you are interested in the many airline and airport operational advantages inherent in Bendix G.C.A., write today to Bendix Radio for more information on Bendix G.C.A.

VHF Transmitters • H. F. Transmitters • Radio Control Panels • Antennas • Indicators • Automatic Radio Compasses • Marker Beacon Receivers • Announcing Systems • VHF Communication and Navigation Receivers • Inter-Communication Systems • H. F. Receivers • Radio-Magnetic Indicators • Ground Controlled Approach Landing Systems • Flightweight Personal Plane Radios • VHF Omni-Directional Range Systems

Whatever the Plane or Purpose...

Bendix Radio is the Choice

BENDIX RADIO — BENDIX RADIO DIVISION of Bendix AVIATION CORPORATION

REG. U.S. PAT. OFF. — BALTIMORE, MARYLAND

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York

OUTSTANDING example of our growing commercial transports is the Lockheed Constellation which in its most recent version grosses 130,000 pounds. Here it is shown alongside one of the earlier models.

Expanding Transport Designs . . .

. . . new models give better performance, retain familiar lines

AT ONE time it was possible to state with reasonable certainty that the Douglas DC-3 was a 21-passenger transport, with 95-foot wing span, 64 feet five inches long and grossing about 24,500 pounds. That day is gone. Today one has to get out the specification sheet and see what model DC-3 is being discussed.

Gross weights have always had a way of moving up during the operational life of the airplane. Military pilots of the Douglas C-47 were amazed to find the low gross weights allowed the civil operators with planes which they had consistently and successfully overloaded in wartime operation.

Since the end of World War II something more spectacular than mere weight increases has been taking place. Four of the early postwar model transports, transports in world-wide use, and even the warweary DC-3 itself, have been redesigned to introduce larger sizes and greater payloads into airline operation.

Keeps Public Confidence

No small advantage of this redesign of existing models is the ability of the new model to hold the public's confidence, a factor which it takes considerable time and money to develop with any new-appearing piece of equipment. Of more immediate tangible help is the retention of basic systems and equipment with which both operations and maintenance personnel are familiar.

Take the Lockheed Constellation (above). In the Model 649 introduced immediately after the war the gross weight was 94,000 pounds, up 4,000 pounds over the wartime Model 49. The new Lockheed L-1049C Super Constellation has been stretched upward to 130,000 pounds gross weight. No small factor in the increased weight has been the addition of over 18 feet additional fuselage length.

The 75,000-pound empty weight of this Super Connie is only 15,000 pounds below the initial gross weight of the earlier sister ships. Needless to say there are other improvements: greater passenger capacity, longer range, higher payloads and proved reliability.

Looking at the Douglas DC-6B (see cut) one would find it difficult to distinguish it from the DC-6's now in world-wide airline service. Yet the fuselage is five feet longer, the gross weight has been upped from 97,200 pounds to 106,000 pounds, improved Pratt & Whitney engines have been installed and the cruising speed

ORDERS for the Convair 340 (left) have added up to 84 since the new model was announced early this year. Gross weight is up 3,280 pounds to 45,000 pounds, fuel capacity up 700 gallons to 1,700 and wing span is 14 feet more than the Model 240. As the successor to the Martin 2-0-2, the 4-0-4 (right) provides 2,850 pounds higher gross weight, 340 gallons extra fuel, and 39 inches additional fuselage length, as well as an improved model of the Pratt & Whitney R-2800 engine, the CB-16.

DOUGLAS DC-6B is the passenger version of the DC-6A cargo plane. It has five feet additional fuselage length, higher gross weight and higher cruising speed than the DC-6's in general airline use.

While only one airline, Capital Airlines, has yet ordered the Douglas Super DC-3, the U. S. Navy has 100 on order and the U. S. Air Force is evaluating it at about 40,000 pounds gross weight as a search and rescue plane.

upped to 316 miles per hour. Six hundred and eighty gallons additional fuel provide greater range.

Twin-Engined Redesigns

The story is the same with twin-engined equipment. The passenger that can readily distinguish the Convair 340 from the Model 240 (which has yet to have been involved in a fatal crash after three years of airline service around the world) will indeed be attentive. Yet the 340 has almost 14 feet greater wing-span than its predecessor, its gross weight is up 3,280 pounds, four additional passengers are provided for (as well as more cargo space) fuel capacity is up 700 gallons to 1,700 gallons.

The Martin 4-0-4 is an all-around better airplane than its sistership, the Martin 2-0-2. Added fuselage length provides for four additional passengers, improved engines enable the airlines to use higher gross weights, particularly when operating from airports above sea level or at high ambient temperatures.

There has been some comment that the only thing wrong with the Douglas Super DC-3 is that it has the old-style landing gear, the passengers having come to expect the tricycle type gear. If so, that's about the only thing Douglas missed. The added fuselage length provided for three more passengers without a change in spacing, the larger engines and fully retracting landing gear provided higher cruising speed and the integral step-type door and improved cargo facilities enabled the operator to cut ground time, speedup block time.

The key to many of the changes is flexibility. Every airline has its own operating problems. Capital Airlines finds the DC-3 ideal for some of its short flight legs. American Airlines expects to use the added space in the Douglas DC-6B to provide needed cargo space on passenger flights. Others will use this space for more passenger seats. The Super Constellation may be the real answer to high-density coach operations and certainly the Wright Turbo-Cyclone compound engines will offer a new brand of fuel economy to the commercial airlines.

Our Growing Transport Planes

	Consolidated Vultee Aircraft Corp.		The Glenn L. Martin Co.		Douglas Aircraft Co.		Douglas Aircraft Co.		Lockheed Aircraft Corp.	
	240	340	2-0-2	4-0-4	DC-3	Super DC-3	DC-6	DC-6B	L-649	L-1049
Span	91′ 9″	105′ 8″	93′ 3″	93′ 3″	95′ 0″	90′ 0″	117′ 6″	117′ 6″	123′ 0″	123′ 0″
Length	74′ 8″	80′ 2″	71′ 4″	74′ 7″	64′ 5″	67′ 8″	100′ 7″	105′ 7″	95′ 1″	113′ 3″
Height	26′ 11″	27′ 10″	28′ 5″	28′ 5″	16′ 11″	18′ 3″	28′ 5″	28′ 8″	23′ 0″	23′ 0″
Gross Wt., lbs.	40,500	45,000	39,900	42,750	24,400	31,000	97,200	106,000	94,000	130,000
Empty Wt., lbs.	26,400	29,372	26,930	29,402	16,857	19,500	51,500	54,148	56,590	75,000
Engines	P & W R-2800 CA-18	P & W R-2800 CB-16	P & W R-2800 CA-18	P & W R-2800 CB-16	Wright R-1820 G102	Wright R-1820 C9HE	P & W R-2800 CA-15	P & W R-2800 CB-17	Wright R-3350 18-BD1	Wright R-3350 C18DA-1
Wing Area, sq. ft.	817	920	864	864	987	967	1,463	1,463	1,650	1,650
Passengers	40	44	36	40	21	24	52	64	44-64	92
Fuel, gals.	1,000	1,700	1,010	1,350	802	1,604	4,700	5,380	4,690	6,570
Cruising Speed	272	292	286	280	180	251	313	316	328	311

AA Honors Engineer, Tool Designer

Lindberg, Griggs Win Industry Awards

JOHN E. LINDBERG
Pan American World Airways

JOHN E. Lindberg, Jr., Pan American World Airways engineer, has been chosen by a board of three industry judges as the winner of AMERICAN AVIATION's second annual Engineering Award and Elmer L. Griggs, tool designer with United Air Lines, has been adjudged winner of the Maintenance Award.

Lindberg was picked for his work in the design and development of an engine analyzer now known as the Sperry engine analyzer and manufactured by Sperry Gyroscope Co. under license to Lindberg for commercial and military use. The engine analyzer, described briefly below, has already revolutionized ignition and vibration trouble-shooting work with aircraft engines and opened up new concepts of analyzing general engine operation.

Griggs was chosen for personal research and development work in devising a means of swaging (mechanically reshaping) metal of the valve guide boss in engine cylinders in a fashion which makes it possible to salvage large numbers of cylinders which were previously scrapped. The problem is common to operators of the Pratt & Whitney R-2800 and R-4360 engines and the cure is one which shows promise of application in related fields.

In recognition of the personal achievements of these two men, Lindberg and Griggs, in furthering the engineering and maintenance goals of their companies and contributing toward industry improvements, American Aviation Publications will award each man $100 in cash, plus a commemorative plaque. These awards will be made during the Air Transport Association's annual engineering and maintenance conference at the Drake Hotel in Chicago, Ill., April 24-26.

In addition to the two award winners, the judges singled out for special mention two other engineers and four maintenance men for work which stood out above the other entries.

Engineering Award

Lindberg is with Pan American's Pacific-Alaska Division. Because ignition difficulties have historically been the cause of a large percentage of airline delays and related maintenance and operational costs, PAA devoted considerable research toward development of a universal trouble-shooting tool. In the engine analyzer Lindberg developed just such a tool.

It permits continuous monitoring of ignition, combustion and mechanical performance of any cylinder, timing and synchronization of magnetos, and synchronization of engines. It can be used as a standard piece of flight equipment, as in the case of Pan Am's Boeing Stratocruisers, or as ground equipment with one instrument serving a whole fleet for maintenance trouble shooting or in a test house for post overhaul checking.

Sperry Gyroscope Co. did the final product designing on the Lindberg development and first installation was made on a PAA Lockheed Constellation. PAA's own experience and the aggressive Sperry program brought the engine analyzer wide-spread acceptance and the industry some immediate results. Consequently, at last count, this was the status of analyzer use:

Users of Analyzer

- **Pan American** is using it as standard flight equipment in all of its 20 Boeing Stratocruisers and for engine test stand and accessory overhaul tests.
- **Northeast Airlines** has all its new ships wired for the analyzer and is using it for ground tests.
- **Sabena's** planes are wired for flight use of the analyzer and at present it is used for ground testing.
- **Northwest Airlines** has an airborne installation on service test and is using a portable unit in engine test stands.

ELMER L. GRIGGS
United Air Lines

- **American Airlines** is wiring its aircraft for the analyzer and using it as a ground unit and in the engine test stands.
- **Continental Air Lines** is making some use of the analyzer.
- **The U. S. Air Force** plans on using the analyzer in large aircraft and using a portable model for general test stand and small aircraft applications.

Pan American's experience with the engine analyzer has undoubtedly been the most conclusive because of the extent to which it has made use of the new unit. PAA is on record as crediting the Sperry engine analyzer with saving $11,772 per aircraft in the first year of operation, with a projected net saving of $9,000 per aircraft per year in subsequent years. These savings are tangible, being made up of savings by reductions in engine ignition system malfunctions ($4,600) and exhaust valve failures ($4,600). Even writing off the cost of installation, PAA figured a first year net saving of over $5,000 per airplane.

How It Works

Essentially the engine analyzer is a cathode ray tube on which engine and ignition system characteristics, picked up by sensitive detection units chosen to meet the installation needs, are portrayed as miniature graphs. The shape of these graphs is prominently associated with specific phe-

nomena, whether normal or abnormal. Installation on a four-engine aircraft runs to about 40-50 pounds and in PAA's case complete cost was stated as about $6,000 per airplane.

Maintenance Award

United Air Lines was experiencing considerable difficulty with the cylinders of the Pratt & Whitney R-2800 and R-4360 engines. This difficulty did not affect the safety or operation of the engine. Rather it resulted in higher overhaul costs and shorter cylinder life than could otherwise be expected.

Specifically the material of the cylinder head forming the valve guide boss had a tendency to "relax away" from the valve guide due to high operating temperatures. This, combined with the usual loss of boss material experienced when removing worn valve guides during overhaul, created the problem. Oversize valve guides are provided by the manufacturer to permit reaming of the boss material and longer cylinder life than would otherwise be experienced.

United's problem was that it was often necessary to use valve guides several sizes larger than the one removed. This was necessary to provide the proper valve guide fit and alignment. Consequently the overhaul department found cylinder life being limited by a critical condition centering around the valve guide boss. Since cylinders are expensive, the accelerated replacements were serious financially.

The problem was apparent, no satisfactory solution was forthcoming. Although not a part of his assigned responsibilities, Griggs studied the problem and came up with a simple, effective swaging tool which reshapes the boss material to its proper position and returns the valve guide axis to its proper location.

United Air Lines estimated that Grigg's tool will save it $25,400 during its first year of use. On this basis it awarded Griggs $2,545 through its employe suggestion system. Experience has since justified this award and indications are that the annual saving to UAL will be nearer to $40,000.

Any carrier using either the R-2800 or R-4360, both of which use forged cylinder heads, should be able to benefit from similar applications and UAL feels that development of proper facilities and procedures would permit application of the same principal in improving the service life of cast cylinders.

Honorable Mentions

The board of judges recommended that Chicago & Southern's **R. L. Anderson** and Braniff Airways' **R. E. Sawyer** be singled out for honorable mention in the engineering category. In the maintenance category, they chose for special mention **B. A. Minner, Jr.** of Braniff, a joint effort by **Arthur Morgan** and **R. E. Woolsey**

Alodine®
Protects Aluminum and Anchors the Paint Finish

EASY TO USE... Process is foolproof and chemical solution can be applied by dipping, spraying, brushing or flow-coating.

ELECTROLESS... Alodizing is a chemical conversion process.

ECONOMICAL... Low chemical cost, short coating time and low temperature keep overhead down.

EFFECTIVE... The tough, durable Alodized surface makes paint stick to aluminum and resists corrosion. "Alodine" meets these Service specifications: MIL-C-5541; MIL-S-5002; AN-F-20; 16E4 (Ships).

Brush Alodine®

Brush "Alodine" is easily and quickly applied to assembled aircraft in the field, shop, or hangar. Cleaning and coating chemicals for Brush Alodizing are shipped in bulk or in the convenient Brush "Alodine" Chemical Kit No. 1. This Kit contains enough chemicals to treat about 1000 square feet of surface and is an ideal package for use at airfields of commercial airlines or of the Armed Services anywhere.

USE "ALODINE" AND ALODIZED ALUMINUM FOR MAXIMUM PRODUCT AND FINISH DURABILITY!

STANDARD RUST PROOFING PRACTICE THE WORLD AROUND
CHEMICALS ACP PROCESSES

Write for Descriptive Folder.

Pioneering Research and Development Since 1914
AMERICAN CHEMICAL PAINT COMPANY
AMBLER, PA.
Manufacturers of METALLURGICAL, AGRICULTURAL and PHARMACEUTICAL CHEMICALS

You can Depend on Spartan for COMPLETE AERO REPAIR (Repair-Overhaul-Conversions)

AIRFRAMES

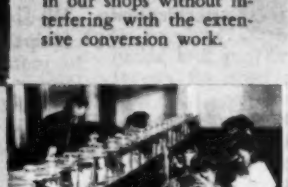
Spartan facilities are so extensive that many 100, 1500, 4000 and 8000 hour checks on aircraft continue simultaneously in our shops without interfering with the extensive conversion work.

POWERPLANTS

Spartan offers you complete overhaul and repair service for any military or commercial engine and its accessories. Large stocks of engine and accessory parts are always on hand. The Spartan machine shop can make any part.

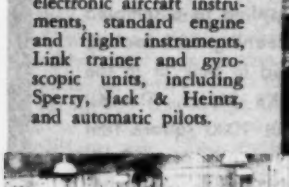
INSTRUMENTS

Spartan provides complete overhaul of all electronic aircraft instruments, standard engine and flight instruments, Link trainer and gyroscopic units, including Sperry, Jack & Heintz, and automatic pilots.



RADIO

You can depend on Spartan from a simple tube replacement to VHF installations or overhaul of automatic direction finders and other complex equipment. Large stocks of parts for standard makes are on hand.

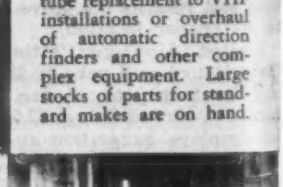


PROPELLERS

Spartan Aero Repair is CAA-approved and factory-authorized for servicing metal, wood and plastic processed types, including metal hubs. Only factory-designed equipment is used.

PARACHUTES

Spartan's Parachute Loft is fully CAA approved to make major repairs, drop-test and repack any make of chute, civilian or military. Replacement parts are stocked for chest, back and seat types. Chair chutes tailored to fit any plane.



23 years of service to the Flying Public and the Armed Services.

MUNICIPAL AIRPORT • TULSA, OKLA. • Repair Sta. No. 50

CENTRAL AIRPORT • Chandler, Okla. • Repair Sta. No. 3530

CAA APPROVED

SPARTAN AERO REPAIR

Complete Repair Departments for Airframes, Propellers, Powerplants, Instruments, Accessories, Radio-electronic Equipment, Parachutes

The Judges

Once again AMERICAN AVIATION is indebted to three prominent industry representatives for their work in judging the entries in its Engineering and Maintenance Awards contest. It was as a direct result of this board's recommendations last year that AMERICAN AVIATION established two separate awards for 1950, one for engineering, another for maintenance.

The judges were:

Allen W. Dallas, secretary of the Engineering and Maintenance Conference and director of the Air Transport Association's engineering division.

A. F. Notley, chief of the Air Carrier Maintenance Branch of the Civil Aeronautics Administration.

Lan Caldwell, chief engineer, Capital Airlines.

AMERICAN AVIATION is grateful to these men for their personal effort, and to their organizations for permitting them to take part in this program to recognize personal achievements on the part of airline engineers and maintenance men.

of Eastern Air Lines, and **Charles R. Meisenbach's** (Frontier) entry.

• **Anderson** developed a pitot head for the airspeed system in current airplanes which can not become waterlogged and which in actual operation has proved to be unusually effective in providing trouble-free operation in heavy icing conditions. Anderson has U. S. patents on the pitot design, which provides for water separation through application of the basic laws of physics not applied in other systems. Chicago & Southern Airlines has been using the CAA approved head on both Douglas DC-3 and DC-4 aircraft. Alaska Airlines, Canadian Pacific Air Lines, All American Airways and Delta Air Lines have also modified their airspeed systems to incorporate the Anderson pilot head.

• **Sawyer,** maintenance engineer with Braniff, devised a system for venting the fuel regulator used in conjunction with the Douglas DC-4 heater system in such a way that it eliminated the fire hazard (as required by a mandatory CAA regulation) without sacrificing heater operating efficiency in the manner in which the standard rework did.

Sawyer adapted a valve originally used in the steam heating system of the DC-3's to the problem. This valve permits air flow in one direction but automatically cuts off liquid flow. Installed in the subject vent line, it permitted proper regulator operation yet eliminated the fire hazard. Both CAA and the heater manufacturer approved, and many airlines have shown interest in the development.

• **Meisenbach,** lead mechanic in Frontier Airlines' accessory overhaul shop, designed and built a unit for cleaning oil coolers. The aim and accomplishment of this cleaning unit was to restore oil coolers permanently removed from service because they were associated with engine failures (in which metal particles and slivers of bearings had entered the oil system.)

Principal innovation in the Meisenbach cleaner is the use of a "paint conditioner" machine, such as used in hardware stores to mix paint by rapidly shaking it back and forth, while heated cleaning fluid is pumped through its passages. The machine uses two cleaning solution tanks for basic sludge removal and final flushing and has air operated reversing valve which changes the direction of flow through the cooler every two minutes. Costing less than $600, the unit saved Frontier over $2,000 in reclaimed coolers in 1950 and also cut cooler cleaning time in half.

• **Woolsey** of Eastern designed and built a unit for permitting accurate compensation of aircraft flux-gate and magnetic compasses without the benefit of a Pelorus or a compass rose at any time of day or night regardless of visibility. His device is simple to apply and has permitted EAL to reduce man-hours required for compass checking as well as provide checks immediately when needed. Compass checks which formerly required 10 man hours are now accomplished in one and one-half man hours.

• **Mechanics Minter and Morgan** of Braniff devised a more simple means of cooling engine cylinders to facilitate the removal of worn exhaust port liners and valve seats. With factory recommended tools and procedures, using water for a coolant, it was sometimes necessary to cut out stubborn units with a torch after first milling out most of the seat on a drill press. At best the method used was messy and time consuming.

Minter and Morgan adapted the factory tools to handle carbon dioxide with effectiveness which has made it possible to cool the cylinders enough that seat and guide removal is no longer a problem. Since its adoption, Braniff has never had to revert to the earlier methods.

Customer Confidence!

AS THE world's largest, oldest and most dependable supplier of aircraft engines, parts and accessories of higher quality, Frank Ambrose Aviation Co. cites its unmatched 27 years of service to aviation as but one of its many recommendations for inviting your patronage.

Another and far more important one for your consideration is the fact that through all these years and changing conditions, Frank Ambrose Aviation Co. has maintained its position and reputation as a firm of the highest integrity and has held the confidence of its customers everywhere!

"First in Quality . . . First in the Industry"

EXPORTERS AIRCRAFT AMBROSE ENGINES COMPONENTS

FRANK AMBROSE
AVIATION COMPANY INC.
34-17 LAWRENCE ST. • FLUSHING • LONG ISLAND • NEW YORK
EXPORT LICENSE NO. 191 ESTABLISHED IN 1923
CABLE ADDRESS "AIRAMBROSE"
BRANCHES
Miami International Airport, Miami, Fla.
11844 West Jefferson Blvd.
Culver City (Los Angeles County) Calif.

American Aviation salutes . . .

Top Pilots of 1950

HENRY C. KRISTOFFERSON
Pan American World Airways

FRANCIS W. WILLIAMS
Military Air Transport Service

RICHARD W. VINAL
Pan American World Airways

MOST of the improvements in modern aircraft design, the improvements which make that new fighter fly higher and faster than its predecessors or those which give the modern transport greater speed and higher payloads, are accompanied by increased complexity which is reflected in the size of the pilot's responsibility.

One of the wonders of the postwar period has been that such a high percentage of the "older" pilots, men who for many years had no choice but to fly by the "seat of their pants," survived the transition to faster, more complex equipment. In every phase—flying technique, knowledge of the airplane, its engines and accessories, navigation procedures, communications, etc.—new avenues of learning had to be travelled.

Yet in the midst of these growing responsibilities, both young and old pilots occasionally perform some particular service which stands out above the everyday performance which the industry has come to expect of them.

No progress report would be complete without singling out some of the civil and military pilots who have helped to make the year memorable for the industry, the country and the world. From nominations submitted by the airlines and by other interested groups, AMERICAN AVIATION has selected five pilots who have distinguished themselves through their exceptional contributions to piloting and to the industry in 1950.

Leadership

BRIG. GENERAL Henry C. Kristofferson, Pan American World Airways pilot and specialist in long-haul operations, was recalled by the U. S. Air Force in August to head up the West Coast Air Lift Task Force (Provisional). This was the special command set up by the Military Air Transport Service to handle the airlift in the Pacific. During the critical summer and fall months Kristofferson was the key man in the now famous Pacific Airlift.

Prior to recall by the USAF, Kristofferson was in active charge of PAA's contract operations with MATS in the Pacific. With PAA since 1934, Kristofferson has held many important flying assignments with the airlines and military services. He flew the first night flight over the "hump" in the famous World War II airlift over the Himalaya Mountains. In November, 1950, with airlift requirements diminishing and the organizational problems under control, the WCALTF was discontinued and Kristofferson returned to his duties with PAA.

Presidential Pilot

LT. COL. Francis W. Williams, better known as "Frenchy," is personal pilot to President Harry S. Truman. Williams, who is actually one of the Military Air Transport Service's top pilots, has been on this assignment since January, 1948. While the most spectacular of the Presidential flights was the famous Truman trip to Tokyo for consultation with General Douglas MacArthur, the President's flying is a regular operation.

The President's acceptance of air travel as a safe and expedient means of travel can not help but improve the general public's acceptance of this mode of transportation. Williams bears the responsibility for making these flights safe and he is well qualified to do so. He took his flight training at Kelly Field with the Army Air Force in 1932, joined American Airlines in 1934 and stayed on as a pilot there until 1942 when he was recalled to service with the Air Transport Command. After two postwar years with American, Williams returned to service with MATS where he soon took over as Presidential pilot.

Technical

CAPTAIN Richard W. Vinal, assistant chief pilot with Pan American World Airways' Latin American Division, supervised the

engineering and flight testing which led to CAA approval of an increase in gross weight for the Curtiss-Wright C-46. His work made it possible to boost payload on the C-46's, which PAA uses in cargo service, by 3,000 pounds.

This was just another feather in a well-decorated cap for Vinal. He set up Douglas DC-6 operation for PAA's Mexican affiliate CMA during 1950. He also supervised PAA's tests with Aerojet JATO units on the Convair Liners.

Flying Boats

HUGH E. RAMSDELL, pilot with Ellis Air Lines in Ketchikan, Alaska, designed a unique rudder for flying boats. While flying boats

HUGH E. RAMSDELL
Ellis Air Lines

once seemed to be a disappearing breed, developments in recent years promise to bring them back to the scene as large-scale transports. Meanwhile, the flying boat is serving a vital role in many areas where other types of aircraft can not operate. The pilots who fly these planes and work toward their improvement form an important part of air transportation.

The Ramsdell development is a water rudder which collapses into a small package under the tail of the twin-engine Grumman Goose. When extended in the water it gives excellent control characteristics, even with one engine inoperative. This means that a pilot can taxi in water on one engine for considerable distances without effort. It also makes it possible to shut down the inboard engine when approaching a loading pier, taxi on the other engine while still maintaining good control.

Transition

J. SCHWAEMMLE was faced with the plight every pilot fears most. He was grounded as an airline pilot when, while flying with Delta Air Lines, he encountered eye trouble which proved to be permanent. He had been flying since 1927, logged over 12,000 hours, was a lt. colonel in the USAF Reserve, held a command

F. J. SCHWAEMMLE
Delta Air Lines

pilot's rating. His experience with Delta dated back to 1935.

Although Delta provided Schwaemmle with a ground job as assistant to the general sales manager, he managed to call on his piloting experience to perform a service very much in need. With the help of fellow employes he built a small plastic model of the Instrument Landing System, later replaced this with a much larger model. Armed with this equipment he has presented over 75 illustrated talks on airline dependability in 26 cities to an audience totaling over 5,000.

Official Airline Guide

- ☆ Revised and published monthly
- ☆ All airline schedules and fares
- ☆ International travel requirements
- ☆ Standard reference of all U.S. airlines

$9.00 per year in U.S.A. and Latin America
$9.50 per year in Canada
$11.00 per year in other countries

OFFICIAL AIRLINE GUIDE
139 N. Clark Street, Chicago 2, Illinois

COLLINS Radio Company congratulates Western Air Lines for rounding its first quarter century of magnificent service to the American public. We are proud to recall that you started using Collins radio equipment when you were only half your present age.

WESTERN AIR LINES 1928 AMERICA'S OLDEST AIRLINE 25th 1951 ANNIVERSARY

COVERAGE

wherever airplanes fly, whenever news is born, American Aviation is there to speed the facts to aviation Men of Decision. The largest and finest editorial team in aviation travels more than 200,000 miles annually to record the news for aviation Men of Decision. Through this audience, American Aviation gained 125 pages of advertising during 1950 over the previous year, a gain of more than 25%.

American Aviation

Washington, D. C.

MEMBER ABC

On-Time Operations

U. S. Scheduled Airlines

AIRLINE	% Scheduled Route Mileage Completed	% On Time Operation Best Summer Month	% On Time Operation Best Winter Month	AIRLINE	% Scheduled Route Mileage Completed	% On Time Operation Best Summer Month	% On Time Operation Best Winter Month
All American	93.13	54	50	National	97.13	90	NA
American	95.89	NA	NA	Northeast	92.57	84	88
Bonanza	97.73	NA	NA	Northwest	96.82	NA	NA
Braniff	98.7	81.9	62.9	Piedmont	98	42.7	47.2
Capital	97.03	73.5	57.4	Pioneer	99.43	88.39	74.02
Central	94.88	NA	NA	Robinson	92.28	NA	NA
C & S	97.82	NA	NA	Slick	86.2	50	50
Colonial	97.1	75.3	83	Southern	96.92	NA	NA
Continental	99.56	NA	NA	Southwest	96.92	NA	NA
Delta	96.63	61	75	Trans-Texas	99.21	NA	NA
Eastern#	97.84	84	78	Trans World (Dom.)	97.2	76.4	61.8
Empire*	97.43	100	98.23	United	98.1	79.2	78.4
Frontier	98.82	NA	NA	Western	97.48	NA	NA
Hawaiian	98.25	NA	NA	Wiggins	71.8	88	NA
Lake Central	90.29	85	78	Wisc.-Central	94	83	51
Mid-Continent	98.64	56	42	West Coast*	95.45	97.5	96
Mid-West	86.53	NA	NA				

* Within 15 minutes.
# Include ATC and weather delays after aircraft left the blocks.

On-Time Operations Again Improve

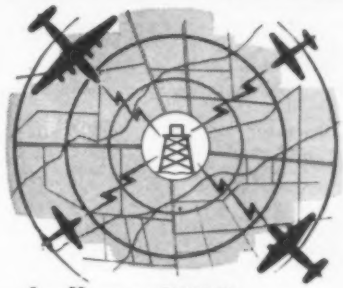
ONCE MORE in 1950 the airlines improved their record for "on-time" operations. A check of survey results shows that there were marked improvements in the percentage of route mileage completed by over 50% of the reporting airlines and gratifying improvements in on-time operations, despite one of the worst winters in many years.

The trend of improvements is noticeable in the tendency of the airlines to tighten up on their definition of on-time. This year virtually all airlines answering the AMERICAN AVIATION survey indicated that any deviation from the published schedule was considered to detract from the record. Last year many of the lines were using a standard 15-minute allowance in denoting late departures or arrivals.

With the exceptions noted in 1950 the airlines used precise published schedules, or in two instances a two-minute leeway, in determining on-time operations. Another tendency, not shown here, was the trend toward keeping separate records of both departure and arrival times in an attempt to locate and eliminate sources of delay.

The on-time contests staged by some of the airlines at individual stations has been an incentive toward improved operations, as has been the habit of holding daily sessions among operational groups to trace down each delay recorded on the previous day and take steps to prevent its recurrence while the incident is still fresh.

OMNI's for ALL



and all get OMNI with ARC's VHF Equipment

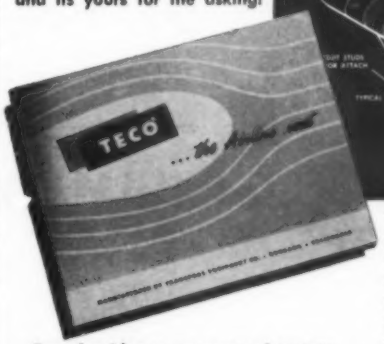
Pilots of private, executive or transport aircraft enjoy the safety of OMNI with ARC's compact Type 15C VHF Navigation Equipment. It takes the work out of navigation—gives a reliable signal to follow, whatever your bearing to or from the station. No worry about drift, no static interference. Type 15C also provides for use of visual-aural ranges, and runway localizers. All ARC airborne equipment is CAA type certificated and designed for reliability and performance, not to meet a price. Write for all details.

ARC

AIRCRAFT RADIO CORPORATION
Boonton New Jersey
Dependable Electronic Equipment Since 1928

HERE'S A WAY TO BIGGER PAYLOADS!

This practical, informative 1951 Catalog on TECO airline seats is your guide to passenger seating requirements . . . and its yours for the asking!



Consult with us on your requirements for airline seats, components, steel tube or sheet metal structure assembly needs at no obligation to you.

The illustration above is but a glimpse of the completely practical and "trade-worthy" seating information in the 1951 TECO Catalog. Structural data, basic specifications, TECO production facilities and our complete line of popular and custom models are shown for your planning considerations. TECO airline seats are the lightest, strongest full-sized airline seats available . . . and that means bigger payloads!
Write for your TECO Catalog TODAY!

TRANSPORT EQUIPMENT CO. • 2505 N. ONTARIO ST. • BURBANK, CALIF.

U. S. Airline Fleet

- *Domestic . . . 909*
- *International . . . 538*

Scheduled Domestic Service

Operator	Douglas				Lockheed					Martin	Boeing		Convair	Curtiss	Total
	DC-6	DC-4	DC-3S	DC-3	749	649	L49	18	10A	202	377	307	240	C-46	
American	49	7	..	..	..	..	..	..	..	..	..	..	79	..	135
All American	..	..	..	11	..	..	..	..	..	..	..	..	..	..	11
Bonanza	..	..	..	4	..	..	..	..	..	..	..	..	..	..	4
Braniff	6	9	..	13	..	..	..	..	..	..	..	..	..	..	28
Capital	..	25	3	25	..	..	5	..	..	..	..	..	..	..	58
Central	..	..	..	3	..	..	..	..	..	..	..	..	..	..	3
C & S	..	2	..	12	..	3	..	..	..	..	..	..	..	..	17
Colonial	..	4	..	8	..	..	..	..	..	..	..	..	..	..	12
Continental	..	..	..	10	..	..	..	..	..	..	..	..	5	..	15
Delta	6	6	..	20	..	..	..	..	..	..	..	..	..	..	32
Eastern	..	25	..	49	20	..	..	..	..	..	..	..	..	..	94
Empire	..	..	..	5	..	..	..	..	..	..	..	..	..	..	5
Frontier	..	..	..	12	..	..	..	..	..	..	..	..	..	..	12
Lake Central	..	..	..	7	..	..	..	..	..	..	..	..	..	2	9
Mid-Continent	..	..	..	20	..	..	..	..	..	..	..	..	4	..	24
National	8	7	..	..	..	..	..	11	..	..	..	..	..	..	26
Northeast	..	..	..	8	..	..	..	..	..	..	..	..	5	..	13
Northwest	..	18	..	2	..	..	..	..	..	21	10	..	..	..	51
Ozark	..	..	..	5	..	..	..	..	..	..	..	..	..	..	5
Piedmont	..	..	..	8	..	..	..	..	..	..	..	..	..	..	8
Pioneer	..	..	..	12	..	..	..	..	..	..	..	..	..	..	12
Robinson	..	..	..	5	..	..	..	..	..	..	..	..	..	..	5
Southern	..	..	..	7	..	..	..	..	..	..	..	..	..	..	7
Southwest	..	..	..	11	..	..	..	..	..	..	..	..	..	..	11
Trans-Texas	..	..	..	9	..	..	..	..	..	..	..	..	..	..	9
TWA	..	14	..	51	29	..	29	..	..	12	..	5	..	..	140
United	44	23	..	58	..	..	..	..	..	..	..	..	..	..	125
West Coast	..	..	..	6	..	..	..	..	..	..	..	..	..	..	6
Western	..	5	..	4	..	..	..	..	..	..	..	..	10	..	19
Inland	..	1	..	6	..	..	..	..	..	..	..	..	..	..	7
Wisconsin-Central	..	..	..	..	..	..	..	..	6	..	..	..	..	..	6
TOTALS	113	146	3	391	49	3	34	11	6	33	10	5	103	2	909

Scheduled International Service

Operator	Douglas			Lockheed			Martin	Boeing	Convair		Curtiss	Grumman	Total
	DC-6	DC-4	DC-3	749	649	L49	202	377	240	PBY	C-46	G21A	
Alaska	..	3	3	..	..	..	..	..	..	..	..	..	6
Alaska Coastal	..	..	..	..	..	..	..	..	..	1	..	5	6
American	49*	7*	..	..	..	..	..	..	79*	..	..	..	135
Braniff	6*	3*	..	..	..	..	..	..	..	..	..	..	9
Caribbean-Atlantic	..	..	3	..	..	..	..	..	..	..	..	..	3
Chicago & Southern	..	2*	12*	..	3*	..	..	..	..	..	..	..	17
Colonial	..	4*	8*	..	..	..	..	..	..	..	..	..	12
Eastern	..	25*	..	20*	..	..	..	..	..	..	..	..	45
Ellis	..	..	..	..	..	..	..	..	..	..	..	6	6
Hawaiian	..	..	13	..	..	..	..	..	..	..	..	..	13
National	8*	7*	..	..	..	..	..	..	..	..	..	..	15
Northern Consolidated	..	..	3	..	..	..	..	..	..	..	..	..	3
Northwest	..	18*	2*	..	..	..	21*	10*	..	..	..	..	51
Pacific Northern	..	1	4	..	..	..	..	..	..	..	..	..	5
Panagra	6	4	10	..	..	..	..	..	..	..	..	..	20
PAA—Altantic Div.	..	32[1]	1	..	..	20[2]	..	28[2]	..	..	..	..	81
PAA—Latin-Amer.	..	[1]	8	..	..	[2]	..	[2]	16	..	..	..	24
PAA—Pacific-Alaska	..	28	..	..	..	[2]	..	[2]	..	..	..	..	28
Reeve Aleutian	..	..	3	..	..	..	..	..	..	..	..	..	3
Trans-Pacific	..	..	5	..	..	..	..	..	..	..	..	..	5
TWA	..	5*	..	19[3]	..	..	..	..	..	..	..	..	24
United	9*	7*	..	..	..	..	..	7	..	..	..	..	13
Wien Alaska	..	..	2	..	..	..	..	..	..	..	2	..	4
TOTALS	78	146	77	39	3	20	21	45	95	1	2	11	518

Source: AMERICAN AVIATION Survey as of December 31, 1954.

* Also shown in domestic service table above. [1] Also operated in Latin American Div. [2] Also operated in Latin American and Pacific-Alaska Divs. [3] 10 additional L-749's listed on domestic service table above.

The AVRO Jetliner--America's First Jet Transport

1. High Cruising Speed
2. High Operating Altitudes
3. High Pressurization

military jetliner meets jet age requirements

TO MEET THE MORE exacting demands of the jet age AVRO Canada offers a high performance military version of the Jetliner.

The Jetliner is designed to cruise at speeds of 460 MPH at 35,000 ft. with cabin pressure maintained at 6,000 ft. Its operational ranges exceed 1200 miles.

The Jetliner's rapid climb, high cruising speed and highly pressurized cabin offer excellent service applications. In spite of its high speed performance, it has ideal low speed handling characteristics. The Jetliner's low-slung configuration simplifies servicing and maintenance.

A. V. ROE CANADA LIMITED

MALTON, ONTARIO

AVRO CANADA

MEMBER OF THE HAWKER SIDDELEY GROUP

U. S. Transport Delivery Timetable

THIS is the official delivery timetable used by the Defense Production Administration and drawn up effective November 1, 1950. Airline equipment ordered since that time has been added but without specific delivery dates. Delivery dates for these latest orders are now being decided by DPA. Well-informed industry leaders doubt that the proposed schedule will be met entirely.

Douglas Aircraft Co.

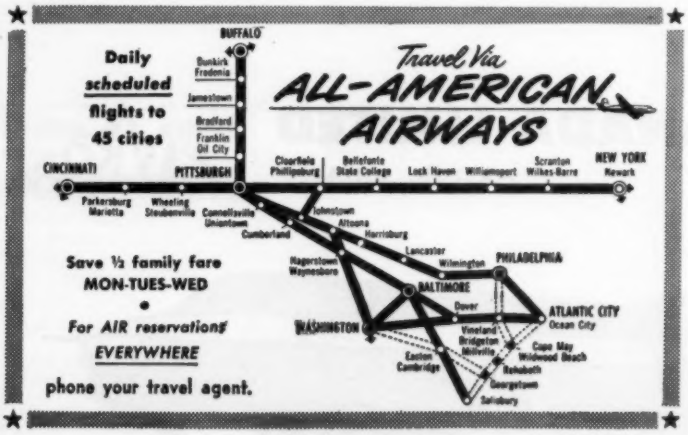
Customer	Undelivered Quantity on Order	1951 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1952 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1953 Jan	Feb
Arabian Oil Co.	2															1				1							
American Airlines	20		1	2	2	2	3	1		(6 in 1951)				(3 in 1952)													
Braniff Airways	6								1	1	1			(3 in early 1952)													
Confidential	1								1																		
Delta Air Lines	1	1																									
KLM	7													1	2	1	2	1									
National Airlines	7	1																		(6 in late 1952)							
Philippine Air Lines	2															1	1										
Pan American World Airways	18										1	2	1	1	2	2	2	2	2	2	1						
Pan American-Grace Airways	2												1	1													
Scandinavian Airlines System	7													1	1		(5 in 1952)										
Swiss Air	2						1	1																			
Slick Airways	3		1							1			1														
United Air Lines	20	1	1	1	2	1		1	1									2	4	1	5						
Unassigned	6																					6					
Air Force	18													2	2	2	2	2	2	2	2						
Navy	11							1	1	2	2	3	2														
Total	**133**	3	3	3	4	3	4	4	4	4	4	5	5	6	7	7	7	7	8	6	8	8	(23)				

Lockheed Aircraft Corp.

Customer	Undelivered Quantity on Order	1951 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1952 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1953 Jan	Feb
Air France	4							1	2	1																	
Air India	2				1	1																					
Avianca	2				1	1																					
Capital Airlines	2													2													
Chicago & Southern	3			1	1		1																				
Eastern Air Lines	14										1	2	3	4	3	1											
KLM	10		1																			2	2	2	2	1	
Trans World Airlines	18	2			1	2	2		1					(10 in spring, 1952)													
Air Force	10																			3	1	2	3	1			
Navy	11															1	3	3	3					1			
Total	**76**	2	1	1	4	4	3	1	3	1	1	2	3	6	3 (Plus 10 in spring, 1952)	2	3	3	3	3	1	2	5	4	2	2	1

The Glenn L. Martin Co.

Customer	Undelivered Quantity on Order	1951 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1952 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1953 Jan	Feb
Eastern Air Lines	60							1	1	2	2		8	8	8	5	(25 starting, 1952)										
Trans World Airlines	40				2	3	4	5	2	6	8					3	7										
Total	**100**				2	3	5	6	4	8	8	8	8	8	8	7 (25)											



Consolidated Vultee Aircraft Corp.

Delivery dates for Convair 340's have not yet been disclosed, but are expected to begin in 1952.

Arabian Oil Co.	2
Braniff Airways	20
Continental Air Lines	7
Delta Air Lines	10
Hawaiian Airlines	4
The Texas Co.	1
United Air Lines	30
Still Unannounced	10
Total	**84**

We salute Western Air Lines on its 25th Anniversary

"Hands off" FLYING SAVES LIVES!

Pilot down! Another job for the Navy's famed air-sea rescue team. With the Piasecki HUP helicopter . . . equipped for "hands off" (automatic) flying . . . the Navy goes into action.

► The HUP is hovering while automatically stabilized by the Sperry A-12 Gyropilot*. Automatic stabilization greatly facilitates hovering over a target, as adjustments are then required only to correct for changes in wind drift.

► *For the helicopter pilot . . .* "Hands off" flying reduces pilot fatigue by freeing him from "flying" constantly with both hands and feet. He is free to concentrate on navigation, communications, rescue and submarine search duties while the automatic pilot takes over.

► *For the Navy . . .* Through the use of the Gyropilot, the HUP has full automatic stabilization in yaw, pitch and roll—the ultimate aim in the rotary wing field. Thus, military uses of the helicopter are almost limitless.

► On all missions, the Gyropilot greatly improves the ability of the helicopter to fly in reduced visibility, to maneuver automatically on take-offs and landings and to make automatically stabilized instrument landings through low weather ceilings.

*T. M., REG. U. S. PAT. OFF.

SPERRY GYROSCOPE COMPANY

DIVISION OF THE SPERRY CORPORATION, GREAT NECK, NEW YORK • CLEVELAND • NEW ORLEANS • NEW YORK • LOS ANGELES • SAN FRANCISCO • SEATTLE

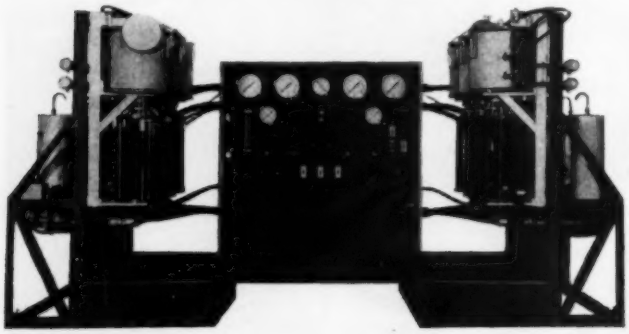
No room for a flight engineer in a Jet!

Landing gear — flaps — brakes — automatic controls — it's too late to worry about them when a pilot's screaming through the air at better than 600. If they don't work . . . *but they will work!*

They work because the entire hydraulic system has been checked under simulated flight conditions with Greer Test Equipment. They'll work because Greer has taken the guesswork out of testing; has replaced the human element with the absolute dependability of precision equipment designed for the greatest accuracy.

Greer manufactures many standard machines for the test and maintenance of all kinds of aircraft — military and commercial. In addition, a staff of expert engineers will develop special equipment to meet your specific requirements.

If you have a service or maintenance problem, you are invited to discuss it with our engineers. There is no cost or obligation. Write or call us today.



GREER
TEST EQUIPMENT

Known the World Over for Accuracy and Dependability

GREER'S MULTI-JET FUEL NOZZLE TEST STAND, WES-901 rapidly and accurately tests the spray pattern, spray cone angle and the fuel flow characteristics of jet engine nozzles. The multi-chamber unit can test one to six nozzles simultaneously under simulated flight conditions with accurate, automatic temperature control. Time interval measuring tests can be made automatically or manually by the operator. This Greer tester can be used generally for almost all single and duplex nozzles of jet engines, and can be supplied to meet any flow or pressure requirement. For further information or help with your test problem, call or write Greer engineers today! No obligation of course.

GREER HYDRAULICS INC. · 450 EIGHTEENTH STREET · BROOKLYN 15, NEW YORK

Airline Transport Deliveries--1950

Airline	Equipment	Number
All American	Douglas DC-3	1
American	Convair 240	5
Bonanza	Douglas DC-3	1
Braniff		None
Capital	Douglas Super DC-3	3
	Douglas DC-4	2
	Douglas DC-3	2
	Lockheed Constellation	5
Central		NA
C & S	Lockheed Constellation	3
Colonial	Douglas DC-4	2
Continental		NA
Delta		None
Eastern		None
Empire	Douglas DC-3	1
Flying Tigers	Curtiss C-46	18
	Douglas DC-4	1
Frontier		NA
Lake Central	Douglas DC-3	6
Mid-Continent	Convair 240	4
Mid-West	Cessna 190	8
National		None
Northeast		None
Northwest	Douglas DC-4	1
Piedmont		None
Pioneer	Douglas DC-3	1
Robinson		None
Slick	Curtiss C-46	5
Southern		NA
Southwest		None
Trans-Texas		None
Trans World	Lockheed Constellation	23
	Martin 2-0-2A	12
United	Douglas DC-6	5
	Boeing 377	2
Western		None
Wiggins	Cessna T-50	2
Wisc. Central	Douglas DC-3	3
West Coast		None

NA—Not available.

By Plane Type

Lockheed Constellations	31
Douglas DC-3's	15
Curtiss C-46's	23
Martin 2-0-2A's	12
Cessna 190's	8
Douglas DC-4's	6
Douglas DC-6's	5
Convair 240's	9
Douglas Super DC-3's	3
Boeing Stratocruisers	2
Cessna T-50's	2
Grand Total	**116**

Source: AMERICAN AVIATION Survey.

high-gloss enamels that out-perform old-style finishes

PROVED-

by airlines, who report that the lasting color and gloss of Glidair Aircraft Enamels reduce cost and time required to maintain the smart appearance of their planes —practically eliminating the need for polishing of painted areas.

by maintenance shops, who say that Glidair Enamels are easier to use and provide uniform, beautiful results that last.

by manufacturers, who have found the brilliant colors, the wide range of shades and the smart finished effects of Glidair Enamels important plus factors in the sales appeal and customer acceptance of their finished aircraft.

In addition to top-quality enamels, Glidair Finishes include specially formulated products for every aircraft need—civilian or military.

THE GLIDDEN COMPANY

AVIATION SALES HEADQUARTERS • 11001 MADISON AVE., CLEVELAND 2, OHIO

Exclusive Export Distributors:
AVIQUIPO, INC., 25 Beaver St., New York 4, N. Y.

For Years **EASTERN Air Lines**

Has Specified **Goodall Fabrics**

CHARLES FROESCH

Chief Engineer of Eastern Air Lines, Charles Froesch says, "We believe that experience counts—in flying planes or weaving fabrics. Our choice of Goodall Fabrics is based on Goodall's long experience in the field. For many years we have chosen Goodall Fabrics exclusively and through previous installations we know that Goodall's seat coverings give extra cushioning comfort...that their aircraft carpeting and harmonizing draperies give us exactly the decorative effect we want...plus long wear and easy maintenance. That's why, wherever Eastern goes, Goodall goes, too!"

You'll find your interior trim problems greatly simplified when the fabrics you choose are produced by people who understand air lines' needs as Goodall does. These *Blended-For-Performance* Fabrics help build business by assuring passenger comfort and satisfaction...help reduce costs because they're easy to clean and retain their beauty through years of heavy wear.

Goodall Fabrics
Subsidiary of Goodall-Sanford, Inc.
THE FINEST NAME IN FABRICS

© 1951, Goodall Fabrics, Inc. (Subsidiary, Goodall-Sanford, Inc. Sole Makers of World-Famous PALM BEACH* Cloth)

*Registered Trade Mark

GOODALL FABRICS, INC. • NEW YORK • BOSTON • CHICAGO • DETROIT • SAN FRANCISCO • LOS ANGELES

U. S. Scheduled Airline Daily Aircraft Utilization

(In Hours—1950 Compared with 1949)

Airline	Douglas DC-3 1950	Douglas DC-3 1949	Douglas DC-4 1950	Douglas DC-4 1949	Douglas DC-6 1950	Douglas DC-6 1949	Convair 240 1950	Convair 240 1949	Martin 2-0-2 1950	Martin 2-0-2 1949	Lockheed Connie 1950	Lockheed Connie 1949	Curtiss C-46 1950	Curtiss C-46 1949	Boeing 377 1950	Boeing 377 1949
All American	7:00	5:00														
Bonanza	4:06	....														
Braniff	6:07	7:00	8:15	6:42	6:40	5:20										
Capital	7:08	8:30	8:09	7:52							5:57	....				
(Super DC-3)	6:56	....														
Empire	5:25	5:37														
C & S	8:32	8:48	8:59	8:01												
Colonial	6:49	7:38	6:32	5:25												
Delta	6:49	7:16	6:46	3:56	6:27	6:44										
Eastern	9:12	10:42	8:12	8:22							8:37	8:40				
Flying Tiger		13:00	10:00										10:00	8:00		
Frontier	6:50	6:58														
Lake Central	3:49 [1]	....											6:31	....		
Mid-Cont.	6:32	7:23					5:43	....								
Mid-West [2]																
National			9:14	7:51	8:38	7:58							2:13	2:19		
Northeast	5:42	6:11	2:55	2:30			5:49	5:47								
Northwest			9:54	9:30					6:36	7:24					6:11	7:24
Pioneer	6:51	6:50														
Robinson	5:43	4:47														
Southwest	5:17	5:37														
Trans-Texas	6:08	6:58														
TWA (Dom.)	7:01	8:15	8:12	5:06					4:47	....	10:12	10:03				
United	4:41	4:50	5:33	5:30	8:07	7:18									3:55	....
Western	8:39	8:00	5:39	2:44			6:23	5:14								
Wiggins [3]																
Wisc. Cent. [4]	....															
West Coast	4:13	4:41														

[1] Cargo.
[2] Mid-West averaged 4:30 with Cessna 190's.
[3] Wiggins averaged 2:32 hours with the Cessna T-50.
[4] Wisconsin Central averaged 7:15 with the Lockheed 10A.

Do you know:

What cost items are included in direct flying costs?

How much does a minute of ground holding time cost an airline?

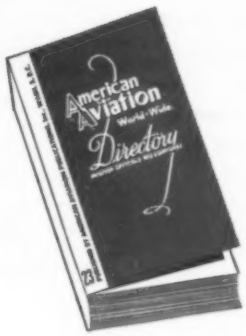
What sections of an airline should be held responsible for maintenance irregularities?

What are fundamental requirements for passenger check-in procedures?

You can find out by reading AIRLINE OPERATIONS, R. Dixon Speas's comprehensive book on airline organization, equipment, procedures, problems, and economies.

Available, at $5 per copy, by writing to

AMERICAN AVIATION PUBLICATIONS
1025 Vermont Ave. N. W.
Washington 5, D. C.



$5.00 per copy

now ready . . .

Spring-Summer—1951

American Aviation

WORLD WIDE

Directory

The only complete reference for the aviation industry

QUANTITY RATES:

5 to 9 copies $4.50 each

10 to 15 copies $4.25 each

15 or more copies $4.00 each

AMERICAN AVIATION DIRECTORY
1025 Vermont Avenue, N. W. Washington 5, D. C.

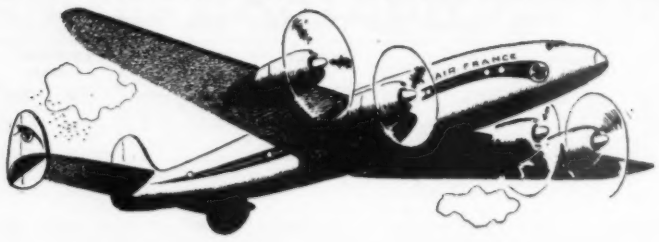
Please send ..... copies of the new 1951 Spring-Summer edition of American Aviation Directory.

NAME .....

COMPANY .....

ADDRESS .....

CITY, ZONE, STATE .....



The Standard For Luxury Air Service To Paris...

AIR FRANCE

The North Atlantic operation of Air France began on June 25, 1946, with only two flights a week. Today, Air France operates the most modern Lockheed Constellations—unequalled for speed, comfort and range—on daily schedules between New York and Paris.

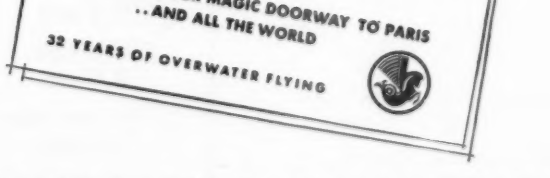
In the past five years Air France has brought to transatlantic flying a degree of luxury that is now the accepted standard for the best in air travel.

Air France was the first to offer passengers a full course dinner, prepared by skilled French chefs and served with traditional French wines, or champagne, and liqueurs.

Air France was the first to provide regularly scheduled *non-stop* service between New York and Paris. "THE PARISIAN" is the newest type Constellation with specially decorated interiors, offering salon spaciousness with luxurious "sky lounger" accommodations—comfortable club chairs by day that become restful "stretch-out" lounges by night.

Skilled technicians keep the huge Constellations—flown exclusively on all trans-atlantic flights—tuned to "watch-like" precision. And veteran crews—347 of Air France flying personnel have flown over 1,000,000 miles, 102 over 2,000,000 miles, and 16 over 3,000,000 miles—share in Air France's well earned reputation for maintaining exceptional dependability and regularity of schedules.

Since its opening, the North Atlantic operation of Air France has made more than 3,000 flights, carrying over 75,000 passengers and more than 1,000,000 pounds of freight. Yet this spectacular growth is only a part of the Air France story. Now, in its 32nd year of overwater flying, Air France operates a world-wide network of over 132,000 miles—the world's largest network of unduplicated air routes—serving 75 countries on 6 continents.



SEE YOUR TRAVEL AGENT OR AIR FRANCE, 683 Fifth Avenue, New York 22, PLaza 9-7000; *District Offices in* Boston, Washington, Cleveland, Chicago, Houston, Los Angeles, San Francisco. *Representatives in* Montreal, Caracas, Bogota, Ft. De France, Havana.

UPWARD TRAFFIC SURGE CONTINUES

30,000,000 Passengers on World Airlines in '50

By SIR WILLIAM P. HILDRED
Director General
International Air Transport Assn.

THE EXPANSION of international air transport continued without interruption during 1950. Preliminary reports of the year's operations by the members of the International Air Transport Association (IATA) indicate that record loads of passengers, cargo and mail were carried by virtually every airline and over virtually every route throughout the world.

Final figures for 1950 should indicate that the international scheduled airlines accomplished 16,500,000,000 passenger-miles, 900 million scheduled aircraft-miles, 500,000,000 cargo ton-miles and 150,000,000 ton-miles of mail. Approximately 30,000,000 passengers traveled an average distance of 550 miles.

Contrary to some expectations, the annual rate of increase in world air transport showed no tendency to taper off, but continued its upward surge to the point where 1949, for all of its own expansion, seemed almost a slack year.

Perhaps the most interesting development of the year was the demonstration that the international air transport market is far more buoyant than many experts had believed possible, achieving its expansion despite threats of war, the effects of devaluation and even the diversion of airline equipment to military uses.

Impressive Cargo Gain

The most impressive improvement in any category of transport was registered by cargo, which showed a one-third increase from 1949 to 1950 and which on a worldwide basis has come in recent years to provide approximately 20% of airline traffic and 15% of their revenues.

The potentialities which have thus been revealed in the market for air transport might very well have gone unrealized if the airlines had not exploited them to the full with a wide variety of inducements for both passenger and cargo traffic. While reductions in basic fares have not been possible, many other expedients were tried out and, in the main,

Passenger Miles in 1950 Eighteen Times More Than 1937

Passenger-miles flown by the world's international and domestic scheduled airlines in 1950 were 18 times more than those flown in 1937, while passengers carried increased more than seven times and miles flown quintupled, according to the International Civil Aviation Organization.

The ICAO statistics show that, not including Russia or China, the world's airlines carried 30.3 million passengers last year and performed 16,404,000,000 passenger-miles. Average number of passengers per aircraft was 18.5 compared with 5.3 in 1937.

The ICAO summary follows:

	Miles Flown	Passengers Carried	Passenger-Miles	Cargo Ton-Miles	Mail Ton-Miles	Average number of passengers per aircraft	Average distance flown per passenger
	millions					(number)	(miles)
1937	167	4.1	885	n.a.	n.a.	5.3	360
1947	718	21.1	11,868	203	90	16.5	562
1948	803	23.6	13,173	314	116	16.4	558
1949	836	26.5	14,478	390	128	17.3	546
1950	889	30.3	16,404	518	143	18.5	541
Percentage Increase or Decrease Between Years							
1947-48 ...	+ 12%	+ 12%	+ 11%	+ 55%	+ 28%	.....	— 1%
1948-49 ...	+ 4%	+ 12%	+ 10%	+ 24%	+ 11%	+ 6%	— 2%
1949-50 ...	+ 6%	+ 14%	+ 13%	+ 33%	+ 12%	+ 7%	— 1%
1937-50 ...	+431%	+639%	+1753%	n.a.	n.a.	+249%	+50%
1947-50 ...	+ 24%	+ 44%	+ 38%	+155%	+ 58%	+ 12%	— 4%

On March 21st, 1951, at the Central Fighter Establishment, R.A.F. West Raynham, England, Lieut. Peter MacDermott R. N. saved his life by using

MARTIN-BAKER
PATENT EJECTION SEAT

to escape from a jet aircraft which was in difficulty.

MARTIN-BAKER
AIRCRAFT COMPANY LIMITED

HIGHER DENHAM N'R UXBRIDGE
MIDDLESEX - ENGLAND

found successful in the 1950 rate structures of the IATA Traffic Conferences.

These have ranged from the whole pattern of the new North Atlantic rate structure, with its combination of on and off season fares and its 15-day round trip reductions, to off-peak hour services between various European cities. The year also marked the introduction of a differential fare system in the Middle East, by which operators flying slower services with frequent stops are permitted to charge lower fares.

In the field of cargo, 1950 was the first full year in which Commodity Rate Boards functioned to provide flexible and more attractive rate structure for shippers of volume cargo.

New Planes Introduced

At the same time, new types of equipment had their small-scale tests in 1950 as a prelude to more intensive use in the future. Commercial air service by turboprop aircraft and helicopters, inaugurated in 1950, will have a more important place in the record of 1951, while preparations for the first commercial jet services should be complete by the middle of this year.

In spite of this record of continuous expansion, 1950 was by no means an easy year for the world's airlines. The setback to traffic which resulted from the impact effect of sterling devaluation in the fall of 1949 was fortunately soon swamped by the general trend of expansion. Nevertheless, the effects of devaluation on airline costs were far-reaching and permanent. All international airlines were adversely affected by the resulting rise in the price of fuel in terms of their own currencies, while the cost of spares and services purchased in the United States by the airlines of other countries increased correspondingly.

Increasing Costs

By the middle of 1950, the airlines, like all other industries, had also to cope with the rising cost of living which was the ultimate result of devaluation. This was soon reinforced by additional expenditures and demands for raw materials and parts which followed the outbreak of hostilities in Korea, and the continuous increase in costs has now spread to payrolls as well.

To date, most international airlines have maintained and to some extent improved their financial position in the face of rising costs, largely by increased efficiency. Whether they can continue to hold the line, however, depends upon whether the rate of increase in efficiency and traffic during 1951 will be sufficient to offset the spiralling cost of everything else an airline uses to make its planes fly.

Trans-Atlantic Air Traffic Goes Up 16%

. . . But U. S. Carriers Get Smaller Share

By Eric Bramley

REVENUE passengers carried both ways across the North Atlantic in 1950 on the regular schedules of the 10 U. S. and foreign airlines flying the route totaled 311,150, a 16.7% increase over 1949.

The three U. S. airlines' share of this traffic was 56.2%, a drop from the 60.1% they carried in 1949. However, the percentage of flights the U. S. lines had to operate to get this total dropped even more, from 61.1% in 1949 to 52.5% last year, reflecting, for one thing, the introduction of larger equipment. Figures include traffic and schedules from both the U. S. and Canada to European points and beyond.

It should be remembered that 1949-50 comparisons are somewhat distorted by the fact that American Overseas Airlines operated only until Sept. 25, 1950, when it was merged with Pan American World Airways. With advent of the winter season, PAA's October-December performance—passengers carried, trips flown, etc.—did not make up for what AOA would have operated in the same period as an independent company.

Certain facts stand out in 1949-50 comparison:

• **The U. S. airlines** last year lost their lead in cargo carried.

• **Passenger travel** on the 10 airlines was 45.8% of the total carried on Atlantic steamships, a gain from the 41.8% of 1949.

• **British Overseas Airways Corp.** stood head and shoulders above any other carrier in gains—a 90.3% increase in passengers carried over 1949, with an 82.2% increase in passenger flights.

• **Of the two U. S. carriers** which operated the entire year, PAA showed a 13.5% gain in passengers while flying 17.6% *fewer* trips. TWA's passenger traffic jumped 26.1%, accompanied by a 9.1% increase in flights. PAA, which in 1949 carried 22.7% of the *total* Atlantic business, dropped off to 22% last year, while TWA increased from 19.7% to 21.3%. PAA, however, operated only 19.4% of total Atlantic flights to get 22% of the passenger business, while TWA flew 22.8% to get 21.3%.

• **The three top passenger-carriers** were the same as in 1949—PAA, TWA and AOA (despite the fact that it operated only nine months), in that order. BOAC jumped from 7th in 1949 to 4th in 1950, replacing Air France, which fell to 6th. KLM was up from 8th to 5th. Only one airline — Trans-Canada — carried fewer revenue passengers in 1950 than in 1949, 16,359 against 21,285, down 23.2%. TCA's trips flown decreased 28.7%.

• **PAA was the leader** in average passengers per flight (33.4), replacing BOAC, which was tops in 1949. All the carriers averaged 29.4 passengers per flight, both ways, in 1950.

Eastbound revenue passenger traffic from the U. S. and Canada showed the three U. S. airlines carrying 81,293 (57.3%) out of a total of 141,871, while flying 2,769 flights (52.7%) out of 5,254. Westbound, U. S. lines

Air Traffic Between U. S.-Canada and Europe, 1950

Eastbound

	Air France	AOA*	BOAC	KLM	PAA	SABENA	SAS	Swissair	Trans-Canada	TWA	TOTAL
Revenue Passengers ..	11,148	19,163	15,610	11,315	31,331	3,578	9,689	1,731	7,507	30,799	141,871
Passenger Flights	473	545	569	455	1,017	170	390	105	323	1,207	5,254
Av. Pass. per Flight ..	23.5	35.1	27.4	24.8	30.8	21.0	24.8	16.4	23.2	25.5	27.0
Cargo (tons)	259.3	242.9	360.7	611.7	745.9	124.4	387.6	95.4	111.0	505.9	3,444.8
Mail (tons)	47.8	317.0	94.8	53.2	771.2	10.6	62.0	11.3	119.0	688.3	2,175.1

Westbound

Revenue Passengers ..	12,745	20,683	20,096	14,900	37,406	4,518	12,415	2,025	8,852	35,639	169,279
Passenger Flights	473	545	574	473	1,035	177	397	105	325	1,205	5,309
Av. Pass. per Flight ..	26.9	37.9	35.0	31.5	36.1	25.5	31.2	19.2	27.2	29.5	31.8
Cargo (tons)	246.5	242.6	298.0	632.0	628.1	117.8	285.5	67.0	254.3	589.4	3,361.0
Mail (tons)	244.3	126.8	375.0	77.6	278.4	13.1	161.3	31.9	13.9	326.0	1,648.3

Both Ways

Revenue Passengers ..	23,893	39,846	35,706	26,215	68,737	8,096	22,104	3,756	16,359	66,438	311,150
Passenger Flights	946	1,090	1,143	928	2,052	347	787	210	648	2,412	10,563
Av. Pass. per Flight ..	25.2	36.5	31.2	28.1	33.4	23.3	28.0	17.8	25.2	27.5	29.4
Cargo (tons)	505.8	485.5	658.7	1,243.7	1,374.0	242.2	673.1	162.4	365.3	1,095.3	6,805.8
Mail (tons)	292.1	443.8	469.8	130.8	1,049.6	23.7	223.3	43.2	132.9	1,014.3	3,823.4

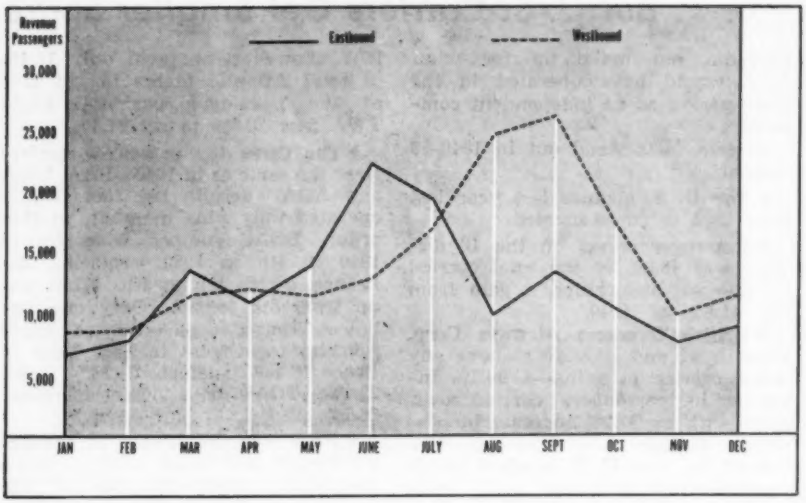
NOTE: Charter flights are not included in totals
* AOA merged with PAA effective Sept. 25, 1950

1950 Trans-Atlantic Passengers—Ship vs. Air

	STEAMER					AIR	
	First Class	One Class	Cabin Class	Tourist Class	No. of Voyages	Total Passengers	No. of Flights	Total Passengers
Eastbound..	76,098	44,500	60,287	134,796	553	315,681	5,315	145,341
Westbound.	84,797	59,362	71,405	159,950	560	375,514	5,355	171,486
Both Ways.	160,895	103,862	131,692	294,746	1,113	691,195	11,670	316,827

Trans-Atlantic Revenue Passengers Carried by U. S. & Foreign Airlines

Monthly Breakdown, 1950



carried 93,728 passengers (55.3%) against 75,551 for the seven foreign lines, and flew 2,785 (52.4%) out of 5,309 flights.

Both ways, out of a total of 311,-150 revenue passengers, U. S. lines carried 175,021 (56.2%) against 136,-129 (43.8%) for the seven foreign carriers. U. S. lines flew 5,554 trips (52.5%) against 5,009 (47.5%) for the foreign companies. In 1949, out of 266,535 passengers both ways, U. S. lines transported 160,190 (60.1%) on 6,472 (61.1%) trips.

In other words, in 1949 the U. S. lines flew 61.1% of the flights in order to get 60.1% of the business. Last year they flew 52.5% of the trips and got 56.2% of the business.

U. S. Lose Cargo Lead

In the cargo field, the U. S. lost the lead it held in 1949, and continued operation of AOA in the last three months would not have changed the picture materially. Eastbound, out of a total of 3,449 tons hauled by everyone, American companies flew 1,495 (43.3%). Westbound, out of 3,361, they carried 1,460 (43.4%). Both ways, they handled 2,955 (43.4%) out of 6,806. In 1949, U. S. lines hauled 53.7% both ways.

In addition to carrying cargo on regular flights, the 10 airlines flew 378 all-cargo trips, down substantially from the 602 operated in 1949. Surprisingly, the No. 1 operator of all-cargo flights was KLM Royal Dutch Airlines, with 70 eastbound and 55 westbound.

Overall, the cargo business showed a 26.2% increase over 1949. The big jump was in westbound trade, up 45.3%. Eastbound increased 11.9%.

How the cargo picture changed can be seen from the fact that the three U. S. carriers hauled 7.9% less eastbound than they did in 1949, while the seven foreign lines were up 34.2% over their 1949 performance. Westbound, the U. S. lines increased 14.6% while the foreign carriers jumped 82.4%. Both ways, the U. S. increase was only 1.6% against 53% for the foreign lines.

Two factors which may have contributed to loss of the cargo lead by the U. S. were outbreak of the Korean war and diversion of business to non-scheduled lines. Substantially fewer all-cargo trips were operated by the U. S. after June, while those of the foreign lines showed an increase. Effect of non-sked competition can be seen from the fact that Seaboard & Western Airlines, with most of its operations on the Atlantic, increased from 4.5 million ton-miles in 1949 to 9.5 million in 1950.

In the carriage of mail, the U. S. lines continued to dominate the picture, principally because they haul most of the mail from the U. S. to Europe. Eastbound, they handled 81.6% of the mail—1,776 tons out of 2,175. Westbound, the foreign lines led with 917 tons out of 1,648, or 55.7%. Both ways, U. S. share was 65.5%, or 2,508 out of 3,823.

Air Freight, Express Make 1950 Gains

AIR FREIGHT volume of the domestic trunklines and the certificated all-cargo carriers shot up another 40% in 1950, reacting to the combined stimuli of a booming domestic economy and the shipment of cargo to and from defense plants and establishments.

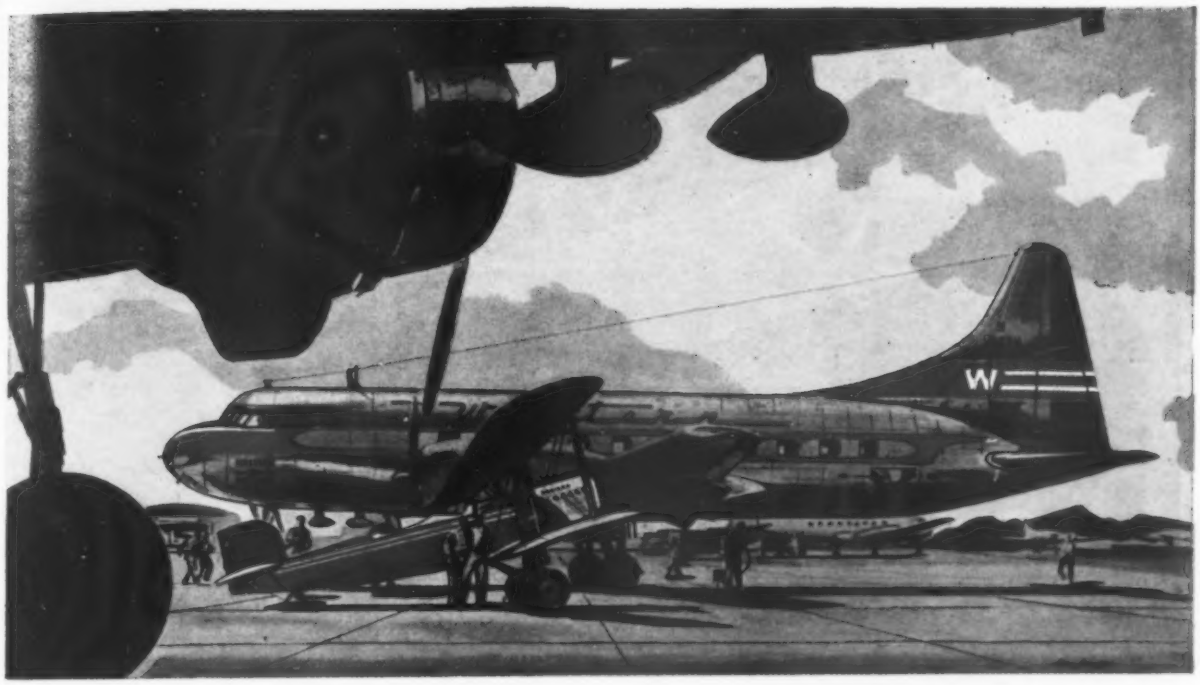
And air express volume, likewise stimulated, recovered from its 1949 slump and registered an increase of 33.8%.

It was a big year and a busy one for the air freight industry as a whole, and particularly so for the three certificated all-cargo carriers—

Air Cargo Growth—1949-1950

Domestic Trunklines & Certificated All-Cargo Carriers

CARRIER	1950 Freight Ton-Miles	1950 Express Ton-Miles	1949 Freight Ton-Miles	1949 Express Ton-Miles
American	35,304,598	7,481,535	31,845,434	5,578,531
Braniff	1,956,236	1,064,368	1,174,865	832,518
Capital	8,586,983	2,288,458	7,450,410	1,747,605
C & S	893,320	730,012	632,951	533 995
Colonial	109,810	84,847	110,397	69,354
Continental	498,873	114,833	371,964	97,881
Delta	3,161,596	1,077,385	1,885,917	717,372
Eastern	9,751,213	4,390,971	9,114,101	3,560,551
Inland	163,574	71,976	126,815	64,736
Mid-Continent	519,972	246,372	353,288	217,395
National	2,912,976	605,779	1,385,367	588,466
Northeast	298,415	187,442	229,966	111.122
Northwest	7,115,826	2,139,416	4,643,245	1,657.866
TWA	13,804,122	6,421,636	12,035,978	4,878,633
United	28,034,278	9,215,794	23,727,149	6,403,978
Western	697,894	508,343	417,662	316,588
Sub-totals	113,809,676	36,629,167	95,505,509	27.376,591
All Cargo				
Flying Tigers	21,435,309	.....	11,942,239	.....
Slick	45,612,474	.....	23,602,074	.....
U. S. Airlines	3,896,585	.....	845 763	.....
Sub-totals	70 944.368	.....	36,390.076	.....
TOTALS	184,754,044	36.629,167	131,895,585	27,376,591

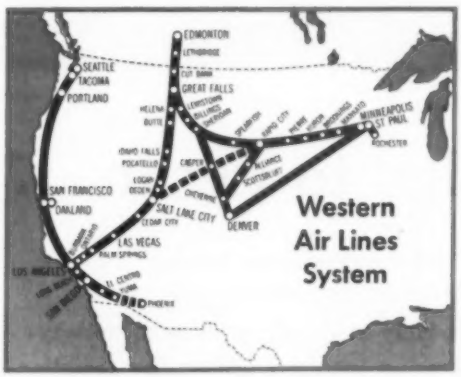


As America's Oldest Airline begins its second quarter-century...

In April, Western Air Lines becomes the first airline in the nation to complete 25 years of continuous operation. Air transport's growth during this quarter-century has speeded the development of the West by setting new standards of travel and communication.

Western is proud to have pioneered from its original route between Los Angeles and Salt Lake City, started in 1926 with two-passenger, open cockpit biplanes, to its present 5000-mile system, serving each day with modern, dependable airplanes, 45 cities in 13 western states and Canada.

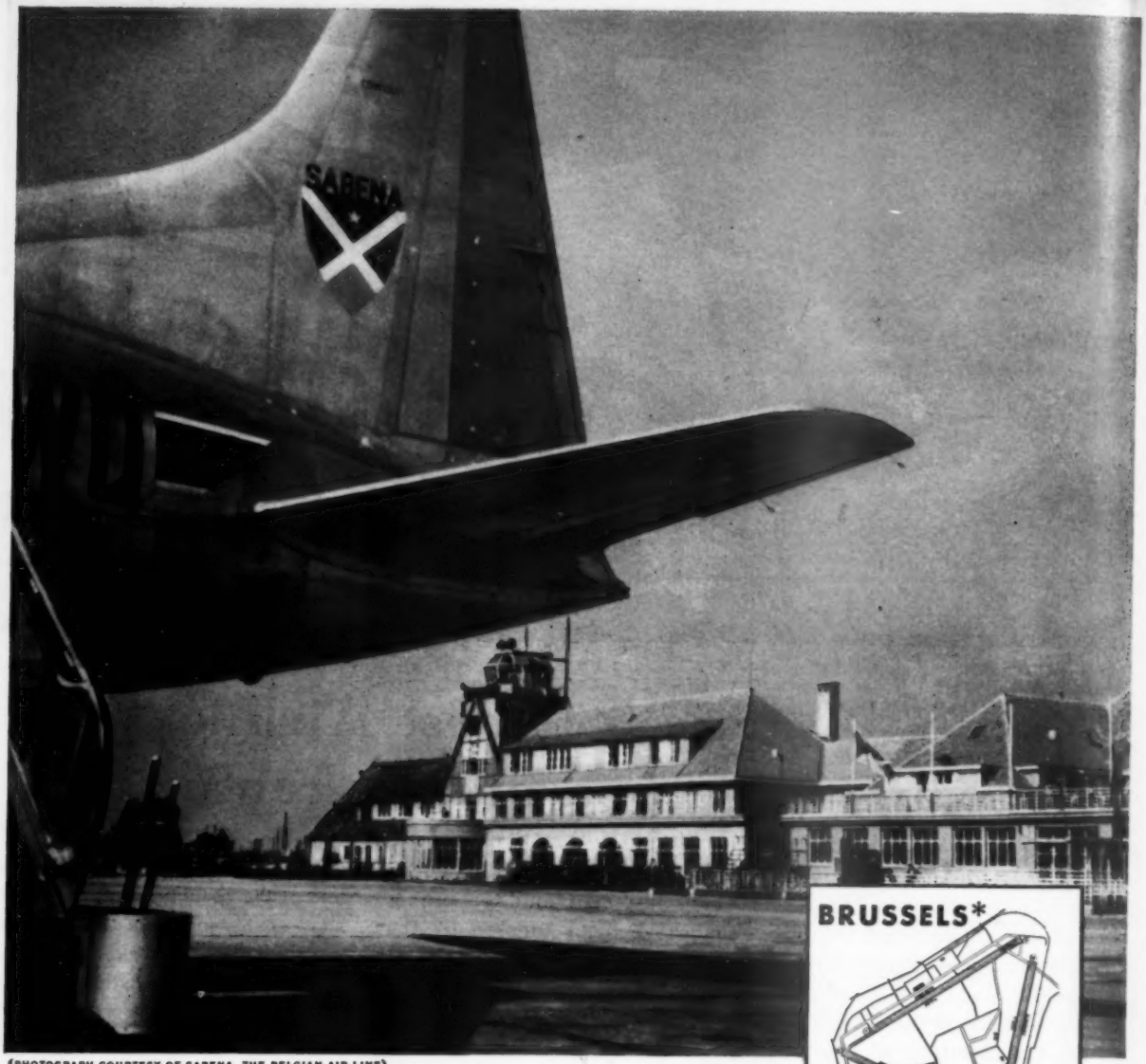
Western is proud to have developed new equipment and techniques that have been adopted by the industry; proud that in addition to meeting the needs of commerce and of the postal service, its record shows many jobs well done for the military during World War II — including the operation for over three years of a vital route between Montana and Alaska. Today some of Western's personnel and aircraft are engaged under Air Force contract in the Pacific Airlift from California to Tokyo.



On its Silver Anniversary, Western pledges its continued effort to strengthen the nation's air transport facilities—for peace, mobilization or war.

WESTERN AIR LINES

25 years of progress by America's scheduled airlines is reflected in the contrast between Western's modern airliners and the little M-2 biplane that made Western's first flight on April 17, 1926. In continuous operation since that day, Western is America's Oldest Airline.



(PHOTOGRAPH COURTESY OF SABENA, THE BELGIAN AIR LINE)

A Good Sign to Fly to . . .

Brussels National Airport, located close to the Belgian capital, is fully equipped to handle air traffic in large volume and of all varieties. Here as elsewhere along the airways of the world, aircraft owners and operators rely on Esso Aviation Products and services. Research and development constantly improve Esso Aviation Products in anticipation of the ever-changing requirements of modern aviation. The Esso winged oval symbolizes petroleum products of uniform, controlled quality backed by more than 40 years of aviation experience.

At Brussels National Airport and throughout Belgium, the marketer of Esso Aviation Products is Esso Standard (Belgium).

ESSO EXPORT CORPORATION, AVIATION DEPARTMENT, 25 BROAD STREET, NEW YORK 4, N. Y.

The Flying Tiger Line, Slick Airways and U. S. Airlines—which in 1950 had their first full year of operations with certificated status.

40% Over 1949

Reports filed with the Civil Aeronautics Board by these three and the 16 domestic trunklines add up to an aggregate 1950 air freight volume of 184,754,044 ton-miles, an increase of 40.1% over the 1949 volume of 131,895,585 ton-miles.

Of this total, the trunklines flew 113,809,676 ton-miles, or 61.6%, compared with 95,505,509 ton-miles and 72.4% flown by the same carriers the year before. Freight volume of the trunkline group was 19.2% higher last year than in 1949.

The all-cargo lines, on the other hand, registered an impressive 94.9% gain over 1949 volume, flying 70,944,368 ton-miles of freight last year compared to 36,390,076 ton-miles the year before. These three carriers handled 38.4% of the total air freight volume in 1950, against 27.6% in 1949.

Except for an inconsequential drop in the volume carried by Colonial Airlines, all of the certificated trunk and all-cargo carriers showed increases in freight ton-miles flown in 1950, as compared to 1949, with the gains ranging from a 7% gain for Eastern Air Lines to a 93.3% gain by Slick Airways. U. S. Airlines had an increase of 360% over 1949, but its volume last year was not fairly comparable to that for the previous year because it was inactive for a major part of the latter period.

Slick Hauls 25%

Slick's volume of 45,612,474 ton-miles topped the industry last year and comprised approximately 25% of the volume for all certificated car-

Final 1950 Traffic Rankings of All U. S. Scheduled Airlines

Total passengers . . . 19,353,997 — **Cargo ton-miles . . . 219,101,404**

Rank	Airline	Revenue Passengers
1.	AA	3,575,195
2.	EAL	2,658,270
3.	UAL	2,513,168
4.	TWA	1,713,622
5.	Capital	1,405,814
6.	PAA	1,018,831
7.	NWA	858,541
8.	Braniff	662,485
9.	Delta	644,284
10.	Western[2]	527,079
11.	NAL	487,718
12.	NEA	373,385
13.	MCA[3]	359,079
14.	C & S	354,062
15.	Hawaiian	329,249
16.	Colonial	215,034
17.	CAL	208,605
18.	AAA	150,843
19.	Pioneer	132,159
20.	Piedmont	123,958
21.	SWA	121,971
22.	AOA[4]	106,739
23.	Panagra	101,186
24.	Trans-Pac	93,597
25.	Inland[2]	91,545
26.	Caribair	73,245
27.	W. Coast	67,800
28.	TTA	64,995
29.	Robinson	56,894
30.	Wis. Cen.	48,797
31.	Frontier[5]	47,077
32.	Empire	45,490
33.	Southern	38,133
34.	Lake Cen.[6]	21,034
35.	Bonanza	19,932
36.	Monarch[5]	11,536
37.	Central	10,819
38.	Chall[5]	7,680
39.	Mid-West	6,940
40.	Ozark[7]	3,999
41.	Wiggins	3,207
	TOTALS	19,353,997

Rank	Airline	Revenue Pass. Miles (000 omitted)
1.	AA	1,813,904
2.	UAL	1,527,149
3.	TWA	1,462,872
4.	PAA	1,258,030
5.	EAL	1,252,355
6.	NWA	617,925
7.	Capital	429,729
8.	Delta	285,384
9.	NAL	277,882
10.	Braniff	261,917
11.	Western	197,209
12.	AOA	162,931
13.	C & S	145,220
14.	MCA	106,446
15.	Panagra	104,220
16.	CAL	74,288
17.	NEA	71,127
18.	Colonial	68,149
19.	Hawaiian	43,378
20.	Pioneer	37,894
21.	Inland	35,917
22.	Piedmont	26,203
23.	SWA	23,054
24.	AAA	21,251
25.	TTA	14,845
26.	Frontier	12,606
27.	Trans-Pac.	11,840
28.	W. Coast	9,608
29.	Robinson	9,040
30.	Lake Cen.	8,685
31.	Empire	8,607
32.	Wis. Cen.	7,764
33.	Southern	6,649
34.	Caribair	5,909
35.	Bonanza	4,983
36.	Monarch	2,980
37.	Chall	2,246
38.	Central	1,347
39.	Mid-West	1,002
40.	Ozark	594
41.	Wiggins	290
		10,413,429

Rank	Airline	MAIL Ton-Miles[1]
1.	PAA	15,437,940
2.	TWA	13,938,084
3.	UAL	13,106,234
4.	AA	10,262,306
5.	EAL	5,104,260
6.	NWA	4,987,561
7.	AOA	1,798,277
8.	Capital	1,532,246
9.	Braniff	1,395,676
10.	Delta	1,251,003
11.	Western	843,491
12.	NAL	650,686
13.	C & S	644,973
14.	Panagra	623,956
15.	MCA	334,962
16.	CAL	205,955
17.	Inland	134,683
18.	NEA	121,244
19.	Colonial	105,935
20.	Pioneer	99,334
21.	Hawaiian	54,875
22.	TTA	53,640
23.	Frontier	52,071
24.	Piedmont	51,335
25.	Southern	48,769
26.	SWA	46,406
27.	AAA	43,186
28.	Wis. Cen.	40,555
29.	Robinson	23,409
30.	Empire	21,444
31.	Mid-West	17,655
32.	Central	16,344
33.	Chall	11,757
34.	Caribair	10,313
35.	Monarch	10,137
36.	W. Coast	7,360
37.	Lake Cen.	5,834
38.	Bonanza	5,362
39.	Ozark	4,197
40.	Wiggins	1,719
41.	Trans-Pac.	.....
		73,105,694

Rank	Airline	EXPRESS Ton-Miles
1.	PAA	40,374,558
2.	UAL	9,215,794
3.	AA	7,494,595
4.	TWA	6,421,636
5.	EAL	4,390,971
6.	NWA	2,320,024
7.	Capital	2,288,458
8.	AOA	2,063,602
9.	Panagra	1,815,668
10.	Delta	1,077,385
11.	Braniff	1,064,368
12.	NAL	774,857
13.	C & S	730,012
14.	Western	508,343
15.	MCA	254,824
16.	NEA	187,442
17.	AAA	118,890
18.	Hawaiian	118,033
19.	CAL	114,833
20.	Colonial	84,847
21.	Piedmont	84,454
22.	Inland	71,976
23.	SWA	49,394
24.	Pioneer	48,424
25.	Wis. Cen.	48,095
26.	Lake Cen.	45,797
27.	Southern	44,546
28.	Robinson	44,534
29.	Frontier	38,311
30.	TTA	32,074
31.	Empire	18,364
32.	W. Coast	12,011
33.	Monarch	9,693
34.	Chall	9,058
35.	Ozark	8,685
36.	Bonanza	2,053
37.	Trans-Pac.	867
38.	Caribair	.....
39.	Central	.....
40.	Mid-West	.....
41.	Wiggins	.....
		81,987,476

Rank	Airline	FREIGHT Ton-Miles
1.	AA	36,687,667
2.	UAL	33,032,826
3.	TWA	19,926,373
4.	NWA	13,288,525
5.	EAL	10,049,301
6.	Capital	8,586,983
7.	Delta	3,161,596
8.	NAL	3,022,210
9.	Braniff	2,904,326
10.	C & S	1,561,055
11.	PAA	1,270,313
12.	Western	697,894
13.	MCA	534,841
14.	Hawaiian	524,473
15.	CAL	498,873
16.	NEA	298,415
17.	Colonial	164,703
18.	Inland	163,574
19.	Pioneer	142,370
20.	Piedmont	134,346
21.	SWA	126,773
22.	Frontier	105,295
23.	TTA	60,295
24.	Monarch	39,148
25.	Robinson	36,823
26.	Caribair	26,335
27.	Chall	18,064
28.	W. Coast	15,614
29.	Trans-Pac.	14,093
30.	Bonanza	9,495
31.	Central	8,000
32.	Lake Cen.	3,329
33.	AAA	.....
34.	AOA	.....
35.	Empire	.....
36.	Mid-West	.....
37.	Ozark	.....
38.	Panagra	.....
39.	Southern	.....
40.	Wiggins	.....
41.	Wis. Cen.	.....
		137,113,928

[1] Includes air parcel post. [2] Operations of Western and its subsidiary, Inland, should be considered as consolidated, although reports are filed separately as shown here. [3] Includes operations of feeder segment (route 106) awarded company in the Parks Air Lines Investigation Case. [4] Figures are through September 25, 1950, effective date of PAA-AOA merger. [5] Figures for Challenger Airlines and Monarch Air Lines are through May 31, 1950 only. Companies have merged and began operating under the name of Frontier Airlines, Inc., on June 1, 1950. [6] Formerly Turner Airlines. [7] Began operations September 26, 1950.

NOTE: In above tabulation domestic and international operations of companies have been combined.

riers. In 1949, its volume of 23,602,074 ton-miles was exceeded by both American Airlines and United Air Lines. The Flying Tiger Line increased its ton-mile volume from 11,942,239 in 1949 to 21,435,209, or 79.5%, and the third all-cargo line, U. S. Airlines, rose 360.7% from 845,763 ton-miles in 1949 to 3,896,585 last year.

Among the trunklines, the more impressive percentage gains were Northwest Airlines' 53.2%, Delta's 67.6%, Western's 67.1% and Mid-Continent's 47.1%. Carriers showing increases of more than 1,000,000 ton-miles last year over 1949 were American, Capital, Delta, National, Northwest, TWA and United.

Air express ton-miles, which went down 8% in 1949 as compared to 1948, came back last year and moved up from 27,376,591 to 36,629,167, a gain of 33.8%. Every one of the 19 carriers registered substantial gains in this category of traffic in 1950.

Coach Revenues Top $43 Million in '50

DOMESTIC air coach services accounted for more than 12% of the total revenue passenger-miles flown by the certificated domestic trunkline carriers in 1950 and attracted more than 1,000,000 revenue passengers. Coach passenger revenues exceeded $43,000,000.

Reports filed with the Civil Aeronautics Board by the 10 lines which operated coach services in 1950 show that they flew 1,267,381 passengers and 1,056,661,000 revenue passenger-miles in coach services during the year, while offering 1,423,846,000 available coach seat miles.

This resulted in an average passenger load factor of 74.21% for all the scheduled air coach services. Since most of the coach services were not started until late 1949, it was the first full year of coach services for most of the carriers.

318% Gain

The 1,056,661,000 coach passenger-miles flown last year represented a 318% gain over the 252,739,000 flown in 1949, and the 1,267,381 coach passengers represented a 250% gain over the 363,482 of the previous year. Coach seat-miles flown totaled 1,423,846,000 last year, an increase of 294% over the 361,518,000 flown in 1949. Coach load factor for the latter year was 69.9%.

While coach traffic represented only about 12.5% of the passenger-miles flown by the domestic trunklines in 1950, it constituted a good percentage of the total passenger traffic of some of the major coach operators.

• **Western Air Lines,** for example, cashed in on a high-density coach traffic on the Los Angeles-San Francisco route, with its 64,540,000 coach passenger-miles representing 32.7% of total passenger-miles operated during 1950.

• **Northwest Airlines,** which did not extend its coach service all the way across the continent, New York to Seattle, until last September, flew 169,210,000 coach passenger-miles, which was 33% of its total volume. Percentage of coach to total passenger miles for other carriers included: Capital, 25.5%, National, 28.2%, Eastern, 22%, TWA and Delta, 15% each, United, 3.6% and American, 6%.

High Load Factors

Passenger load factors on the coach services were nearly all above 70%, and for six carriers were above 75%. United's average coach load factor of 83.77% was tops in the industry. Eastern and Capital each boarded more than 200,000 coach passengers during the year, while Northwest, TWA, United and Western each had well over 100,000.

Only one coach service was dropped during the year, Chicago and Southern discontinued in November an experimental Chicago-New Orleans coach service started in July.

Only new entry in the coach field in 1950 was United, but nearly all of the coach operators extended their coach routes and increased coach schedules during the year.

Coach passenger revenues for the year aggregated $43,407,701, Eastern being the leader with $10,954,559, followed by TWA with $7,499,336 and Northwest with $6,914,868. Cargo revenues on coach flights added several hundred thousands to the total.

1950 Domestic Air Coach Results

(Compared with 1949)

Carrier	Passengers 1950	Passengers 1949	Passenger-miles (000 omitted) 1950	Passenger-miles (000 omitted) 1949	Available Coach Seat-miles (000 omitted) 1950	Available Coach Seat-miles (000 omitted) 1949	Load	Factor
American	59,672	339	103,165	660	129,860	1,806	79.44	36.54
Capital	205,000	152,727	109,458	81,344	176,153	120,890	62.14	67.20
C & C	7,821	.....	4,028	.....	8,724	.....	46.10	.....
Continental	.....	3,738	.....	2,065	.....	5,198	.....	39.70
Delta	46,453	1,129	42,430	1,333	54,495	2,046	77.86	65.12
Eastern	290,323	20,961	269,359	20,016	336,646	27,607	80.01	72.50
Mid-Continent	.....	6,942	.....	1,838	.....	3,529	.....	52.00
National	72,163	4,849	72,235	5,286	102,592	8,978	70.41	58.88
Northwest	171,188	105,177	169,210	89,606	243,272	119,255	69.56	75.14
TWA	146,578	60,728	170,098	45,481	226,339	60,969	75.15	74.30
United	128,086	.....	52,138	.....	62,224	.....	83.77	.....
Western	140,097	7,342	64,540	5,120	83,541	11,240	77.26	45.55
TOTALS	1,267,381	363,482	1,056,661	252,739	1,423,846	361,518	74.21	69.90

NOTES:

American started New York-Los Angeles coach service December 27, 1949.
Capital was only carrier with two full years of coach experience.
Chicago and Southern operated coach service only from July through November, 1950.
Continental discontinued coach service September 30, 1949.
Delta started Chicago-Miami December 15, 1949, added Jacksonville last April 30.
Eastern started coach operations September 25, 1949, expanded them in 1950.
Mid-Continent discontinued coach service August 10, 1949.
National started November 1, 1949.
Northwest started March 24, 1949, extended transcontinentally September 6, 1950.
TWA started February 6, 1949, extended transcontinentally in December, 1949.
United started Los Angeles-San Francisco last May 14, extended to Portland and Seattle, July 5, 1950.
Western started October 15, 1949.

Irregular Traffic Up 67% Over 1949

THE LARGE irregular air carriers of this country enjoyed a highly successful year in 1950 traffic-wise and as a group, but many of them fell by the wayside during the year and the outlook for another such year for this class of carrier now appears exceedingly dim.

What they will do this year will depend largely upon the outcome of their fight for a stay and reversal of CAB's recently-announced ban on a continuation of route-type operations by the irregulars.

Reports filed with the Civil Aeronautics Board show that 55 non-scheduled carriers flew a total of 447,110 passengers and 761,065,973 revenue passenger miles in 1950. These figures represented gains of 94.6% and 66.8% over the 229,705 passengers and 456,314,086 passenger miles flown by the 45 large irregulars reporting in 1949.

If they got an average of 3c per passenger mile on their year's business, the non-skeds would have taken in about $23,000,000 in passenger revenues during 1950.

From the traffic standpoint, the non-skeds' 1950 volume could have been absorbed without much strain by the certificated lines, for it was the equivalent of only 2.8% of their total passengers and 9.6% of their total revenue passenger miles. In fact, the entire 55 irregulars flew fewer passenger miles last year than did any one of the Big Four airlines.

Even so, 20 of the non-skeds flew over 10,000,000 revenue passenger miles in 1950, and one of them, Oxnard Sky Freight, flew over 125,000,000.

Uncertain Future

However, it was a year of uncertainty for the large irregulars.

CAB's machinery for the handling of applications of large irregulars for operating exemptions was not set up until May of last year, and it proceeded slowly throughout the ensuing seven months of the year, acting in one way or another on an average of only about seven applications per month.

It was not until the first three months of 1951 that action with regard to the non-skeds was speeded up, and by the end of March the Board had granted two-year exemptions to 14 of the applicants, of whom only six had conducted any passenger operations in 1950. Another 20 applications had been dismissed or denied finally, and only a few of these had any passenger operations in 1950. One of the larger ones, Viking Air Lines, had had its letter

THIS YEAR, TAKE A

WORLD VACATION

THE NEW IDEA IN TRAVEL IS 'ROUND-THE-WORLD

Now, **you** can join the ranks of those fortunate travelers who have been **around the world.** This year Philippine Air Lines offers special 'round-the-world trips along the fascinating "Route of the Orient Star." Depending on your destination, the cost in many cases is only slightly more than round trip fares. Smart travelers are discovering the added pleasures of this unique travel plan — and the distinction of being **truly** a **world** traveler.

FLY THE ROUTE OF THE Orient Star with Philippine Air Lines for the finest in international air travel.

- ★ Dependable Douglas DC-6 planes
- ★ Luxurious, full-size sleeping berths
- ★ Courteous, personalized service
- • Weekly service from London, Madrid and Rome to Manila and Orient points
- • Twice weekly between San Francisco and Manila via Honolulu

Write for free illustrated travel booklet and special "Round-the-World" folder. See your Travel Agent or nearest P.A.L. office.

PHILIPPINE AIR LINES

SPANNING 2/3 OF THE WORLD

OFFICES IN LONDON · PARIS · MADRID · ROME · TEL AVIV

suspended last summer, Golden North Airways had operated for only three of the four quarters, and Air America, Inc., had reported no passenger operations after the first quarter of 1950.

Two of the operators with the highest volumes of passenger traffic last year—Oxnard Sky Freight and Arrow Airways—have now dropped out of the picture. Oxnard, under fire for repeated violations of CAB's economic regulations, consented to surrender its letter this month, and Arrow's appeal from a revocation order was denied finally. Another of the major irregulars at the start of last year—Aviation Corporation of Seattle, had its letter suspended in mid-year and has not operated since.

Of the approximately 30 non-skeds whose applications have not been acted upon, a majority reported no operations last year, and a number of them are thought to be out of business.

Irregular Air Carrier Large Aircraft*

International and Domestic Service

As of December 31, 1950

CAA Regions	Active Operators	Douglas DC-4	Douglas DC-3	Boeing 307	Boeing 247	Curtiss C-46	Convair PBY	Totals
Region 1	10	2	5	1	..	9	..	17
Region 2	23	..	12	1	..	40	..	53
Region 3	1	..	4	..	..	1	..	5
Region 4	1	..	4	..	..	..	..	4
Region 5	1	..	1	..	..	..	..	1
Region 6	20	13	18	..	1	7	..	39
Region 7	6	..	5	..	..	12	..	17
Region 8	0	..	..	..	..	4	1	5
Region 9	1	..	..	..	..	1	..	1
Int'l Reg. ...	5	25	3	..	..	18	..	46
TOTALS ..	**68**	**40**	**52**	**2**	**1**	**92**	**1**	**183**

Source: AMERICAN AVIATION Survey

* This does not include the irregular air carrier aircraft below 12,500 lbs.

NOTE: Includes operators certificated under CAR 45, in addition to CAR 42, except those engaged in scheduled intrastate passenger service.

Regional distribution of aircraft based on location of principal maintenance base.

Excludes aircraft which may be operated by scheduled air carriers in irregular air carrier service except when such aircraft are utilized in irregular air carrier operation only.

Domestics' Safety Equals Record Year

WHILE not a record year for the scheduled airlines when compared with the best previous year, 1950 was newsworthy in the light of overall safety in air transportation.

• **Among the scheduled domestic airlines** the passenger fatality rate of 1.2 passengers per 100 million passenger miles was equal to that established in 1946, the best year in the past decade. Only one of the 16 domestic trunk airlines was involved in fatal accidents.

• **Combined domestic and international** U. S. scheduled airline record was 1.4 fatalities per 100 million passenger miles in 1950, the second best year in more than a decade.

• **Scheduled air cargo operators** had no fatal accidents last year and have had none since October, 1949.

• **Military Air Transport Service** flew 809,883,402 passenger miles in 1950

1950 Traffic Results of U. S. Large Irregular Air Carriers

Carrier	Revenue Passengers	Revenue Passenger-Miles
Aero Finance Corp.	8,541	9,784,334
Air America, Inc.	2,508	3,772,517
Air Services, Inc.	3,144	2,453,717
Air Transport Associates	10,385	16,936,771
Airline Transport Carriers ...	2,503	1,403,958
All-American Airways (Miami)	520	545,344
American Air Export & Import	33	20,460
American Air Transport, Inc. ..	17,882	18,585,970
American Flyers, Inc.	2,800	1,820,237
Arctic Pacific, Inc.	19	31,160
Argonaut Airways, Corp.	8,887	7,883,674
Arnold Air Service	1,644	2,586,208
Arrow Airways	23,504	* 46,006,498
Associated Air Transport	125	100,559
Aviation Corp. of Seattle	9,985	11,902,139
Blatz Airlines, Inc.	5,366	2,583,738
Capitol Airways, Inc.	1,050	1,213,927
Central Air Transport	4,280	6,393,040
Continental Charters, Inc.	15,213	24,055,465
Economy Airways, Inc.	7,759	12,746,382
Federated Airlines, Inc.	4,100	5,248,410
Freight Air Inc.	2,577	2,301,136
General Airways, Inc.	1,501	2,366,142
Golden North Airways, Inc. ..	2,140	3,124,364
Great Lakes Airlines, Inc.	23,500	42,147,181
Hemisphere Air Transport ...	278	333,600
Johnson Flying Service	483	41,670
Los Angeles Air Service	10,003	18,779,316
Meteor Air Transport, Inc. ...	395	291,710
Miami Airline	11,509	16,411,990
Missouri Airways	736	349,115
Modern Air Transport	21,895	33,172,988
Monarch Air Service	10,045	19,395,364
Nationwide Air Transport	14,450	11,821,391
New England Air Express	13,121	22,754,687
Ocean Air Tradeways	1,897	3,086,212
Overseas National Airways ...	2,190	12,674,000
Oxnard Sky Freight	81,039	129,212,200
Pearson Alaska, Inc.	2,583	2,841,040
Peninsular Air Transport	14,910	** 17,565,297
Quaker City Airways	648	625,619
Robin Airlines	9,915	21,249,834
Royal Air Service	1,222	1,799,419
SSW, Inc.	837	1,465,321
Scott Aero Service (U. S. Aircoach)	3,229	7,850,311
Seaboard & Western Airlines .	10,012	46,253,032
Standard Air Cargo, Inc.	2,606	3,306,456
Stewart Air Service	1,819	1,025,732
Trans-American Airways	15,526	22,036,083
Trans-Caribbean Air Cargo ...	2,150	2,988,700
Trans-National Airlines	1,762	2,543,264
Transocean Air Lines	27,567	82,266,434
Viking Air Lines	14,060	31,197,810
World Airways, Inc.	10,243	21,704,757
Zigler Flying Service	14	9,110
TOTALS—1950	**447,110**	**761,065,793**
TOTALS—1949	229,705	456,314,086

* Estimated, returns incomplete.

** Fourth Quarter figures not available.

with a single accident which took the lives of 30 passengers. This was the first fatal accident in MATS' three-year history and moved its fatality rate for 1950 to 3.7 fatalities per 100 million passenger miles.

• **U. S. international airlines** had only one fatal accident for a yearly rate of 2.1 fatalities per 100 million passenger miles. At the time of this accident these operators had completed 28 months and about 5 billion passenger miles without a fatality.

There were so few accidents in 1950 that it is impossible to trace much of a trend. In 1947, with postwar equipment on the increase, there was an average of 40 passenger fatalities per fatal accident among scheduled airlines. There was a feeling that the rate might stabilize at about this level in postwar years. This was not the case. In 1950 the average was only 24 passenger deaths per fatal airline accident.

There were only three fatal accidents among the domestic scheduled airlines but one of these, the case in which a complete plane and contents disappeared during a storm centered over Lake Michigan, claimed 55 passengers, more than half the 96 fatalities during the whole year.

Irregulars Improve

The safety record of the large irregular air carriers during 1950 was a major accomplishment. In the services which these operators offered to the general public there were no fatalities in 1950. With 761,000,000 passenger miles flown by large irregulars in 1950, all 28 fatalities involved accidents in contract service, flying special groups under charter.

This gave the large irregulars a rate of 3.7 fatalities per 100 million passenger miles compared with a rate of 18.2 in 1949 and 20.4 in 1948.

MATS Record Good

Representative of the improvements in safety of operations in the Military Air Transport Service is the fact that the 1949 accident rate of 29 non-fatal aircraft accidents per 100,000 flying hours was cut to 19 per 100,000 hours in 1950. Major accidents, those in which the plane is destroyed or damaged to an extent that 75 or more man hours are required for repairs, dropped from 83 in 1949 to 69 in 1950. Minor accident dropped from 55 in 1949 to 38 in 1950.

In all of these cases, in both civil and military, scheduled and nonscheduled operations, it should be pointed out that the exposure rate was greatly increased during 1950 over all other years. Passenger miles on the domestic trunk lines was up 13.8%, local service airlines up 46.2%, international airlines up 9.9% and irregular operators passenger miles up about 67%.

NOW... on the route of

WISCONSIN CENTRAL AIRLINES

DE LUXE DC-3 AIRLINERS

Finer — Faster Flights
Chicago and 30 Cities
Wisconsin — Upper Michigan — Minnesota
Convenient Connections with 15 Major Airlines

TRAVEL AGENTS —
CONNECTING AIRLINES
...Sell this improved service
Route your passengers
ALL THE WAY BY AIR

WISCONSIN CENTRAL AIRLINES

WISCONSIN CENTRAL

Large Airports Get 80% of Aid Funds

. . 178 of 439 grants in 1950

By KEITH SAUNDERS

THE EMPHASIS on Federal aid toward terminal-type airports that had its beginning in 1949 was carried forward at an accelerated pace in the 1950 Federal Airport Program.

Although the total of Federal funds involved in airport grant agreements executed by the Civil Aeronautics Administration last year was $7,000,000 and 16% lower than the $44,868,671 expended in 1949, the amount provided to match local allocations in the construction and improvement of Class 4 and larger airports rose to 80% of the total made available for all classes of airports.

Of the $37,764,208 of Federal funds involved in the 1950 airport grant agreements, $30,304,970 went to the larger airports, pursuant to the wishes of Congress and the wishes of the Air Coordinating Committee. And whereas the 164 grants made to the Class 4 and larger airports in 1949 represented 32.5% of the 504 grants for all airports, the 178 agreements affecting terminal-type airports in 1950 comprised 40.5% of the 439 agreements made during the year.

Class 1 Grants Drop

Further emphasizing the trend toward Federal aid for larger rather than small airports, the number of grant agreements for Class 1 airports in 1950 was only 99, or 22.5% of the overall total, and the funds allocated to Class 1 fields totaled only $1,305,109, or 3.4% of the $37,764,208 granted for all airports.

The 99 agreements for Class 1 airports developed and improved last year represented a 16% decrease from the 118 such agreements made in 1949.

Agreements for Class 2 fields dropped 37.3% last year, totaling only 69, as against 110 the year before. Such agreements represented only 15.7% of the total number in 1950, compared to 21.8% in 1949. Grant agreements for Class 3 fields numbered 93 in 1950, compared to 110 in 1949.

The 99 Class 1 airport grant agreements made last year were widely scattered in a total of 30 states, the largest numbers going to Montana, with 12, and California and Missouri with 10 each. The agreements for Class 2 fields went to 33 different states and those for Class 3 fields to 36 states, with no state receiving any substantial number of such grants.

The grants for Class 4 airports, on the other hand, were spread among 45 of the 48 states.

Federal-State Airport Grant Agreements* 1950

State	Funds Federal	Airport No. of	Airport Class 1	2	3	Larger 4 &
Alabama	$ 322,795	6	..	1	3	2
Arizona	114,153	8	..	2	3	3
Arkansas	325,584	12	2	3	3	4
California	4,085,757	39	10	4	4	21
Colorado	869,491	8	1	1	4	2
Connecticut	968,167	2	..	..	..	2
Delaware	41,200	1	1	..	..	..
Florida	779 982	3	1	..	1	1
Georgia	403,018	9	1	1	1	6
Idaho	344.574	16	5	5	2	4
Illinois	2,208,500	11	1	1	5	4
Indiana	874,990	7	..	2	1	4
Iowa	985,612	11	1	1	3	6
Kansas	251.350	10	1	4	2	3
Kentucky	491,100	8	2	3	1	2
Louisiana	661,002	8	1	1	..	6
Maine	65,788	2	1	..	..	1
Maryland	1,488,397	9	2	2	2	3
Massachusetts	1,874,919	19	4	4	6	5
Michigan	1 252.850	19	8	7	1	3
Minnesota	113,479	5	1	..	3	1
Mississippi	1,802,169	11	1	3	3	4
Missouri	311,819	19	10	1	4	4
Montana	525,291	29	12	6	2	9
Nebraska	195.011	4	..	1	..	3
Nevada	7.400	1	..	1	..	..
New Hampshire	1,183,864	2	..	..	..	2
New Jersey	249,677	8	..	1	5	2
New Mexico	1 012,642	7	..	..	1	6
New York	375,475	7	..	..	5	2
North Carolina	324.238	10	5	1	..	4
North Dakota	936,900	13	3	1	3	6
Ohio	702,783	15	7	..	3	5
Oklahoma	1.252.833	14	2	1	3	8
Oregon	2.053.580	10	2	2	3	3
Pennsylvania	850,000	1	..	..	..	1
South Carolina	268,985	4	..	..	1	3
South Dakota	246,846	9	4	1	1	3
Tennessee	668,310	9	2	2	2	3
Texas	3,537,007	17	3	2	2	10
Utah	156.246	4	..	1	2	1
Vermont	78 750	2	..	..	1	1
Virginia	676,500	3	..	..	..	3
Washington	473.310	11	4	1	..	6
West Virginia	453.350	3	..	..	1	2
Wisconsin	786,500	7	1	1	3	2
Wyoming	112,014	6	..	1	3	2
TOTALS	$37.764,208	439	99	69	93	178

* Does not include grants in Alaska, Hawaii and Virgin Islands.

Source: Civil Aeronautics Administration.

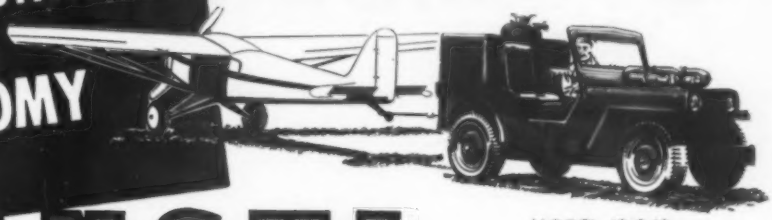
YOU GET *GREATER* FIRE FIGHTING EFFECTIVENESS AND *MORE* ECONOMY WITH

ANSUL

DRY CHEMICAL

FIRE EXTINGUISHING EQUIPMENT

Ansul-equipped "Jeep" Fire Trucks are engineered and built to meet the increasing demand for a low-cost, highly mobile fire and rescue vehicle. Ansul Models J1-340 and J2-340 provide utility and economy not available in larger, more expensive fire trucks.



MODEL J2-340

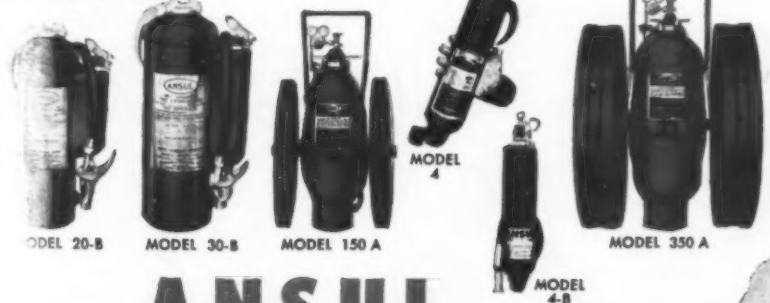
THEY'RE MOST DEPENDABLE TOO! Years of field service at airports, large industrial and chemical plants, refineries, utilities and other locations having special hazards have resulted in outstanding design features available ONLY in ANSUL Dry Chemical Extinguishers.

FIRE PROTECTION by the dry chemical method has proved *Most Effective* as well as *Most Economical.* And only Ansul offers a complete line of hand, wheeled and stationary dry chemical fire extinguishers.

Send for File No. 690. You will receive our latest catalog, a Periodic Inspection Record Chart, "Fundamentals of Fire Extinguishment" and information about Ansul Dry Chemical Piped Systems for automatic protection.

EXCLUSIVE FEATURES

- Quick, Positive Extinguishing Action.
- Easier on-the-Spot Recharge. (No special tools needed).
- No Annual Recharge Necessary.
- Low Maintenance Costs.
- ANSUL *"PLUS-FIFTY"* Dry Chemical used Exclusively.
- Long Range Stream.
- Effective in Winds and Drafts.
- Stream Pattern Forms Heat-Shielding Screen to Protect Operator.
- All Ansul Hand and Wheeled Dry Chemical Fire Extinguishers listed by Underwriters' Laboratories, Inc.



ODEL 20-B MODEL 30-B MODEL 150 A MODEL 4 MODEL 4-B MODEL 350 A

ANSUL FIRE TRUCK

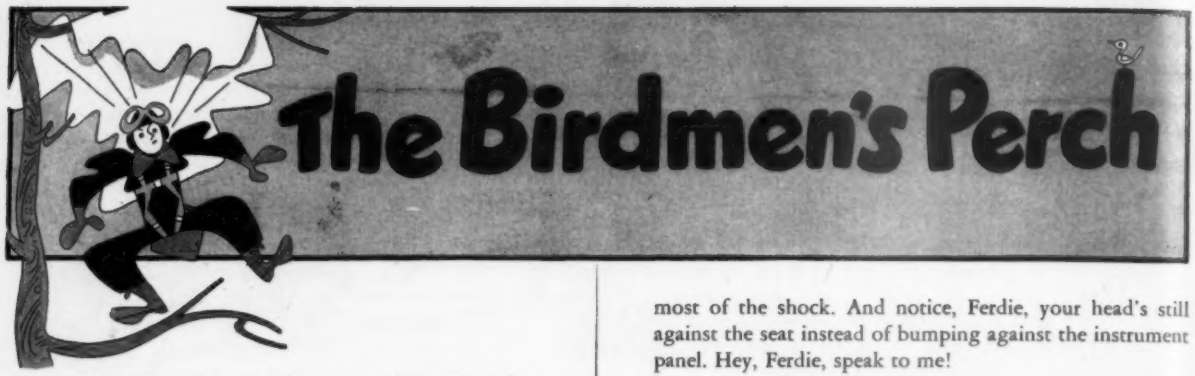
ANSUL CHEMICAL COMPANY

FIRE EXTINGUISHER DIVISION

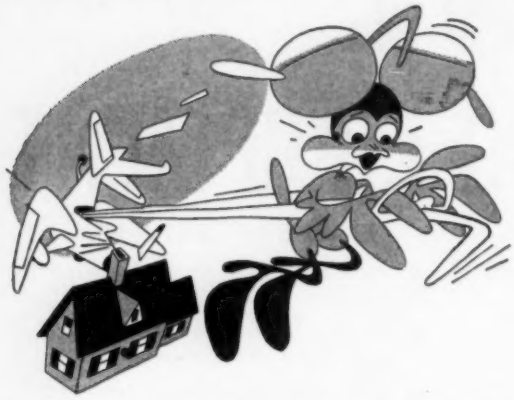
MARINETTE, WISCONSIN

DISTRIBUTORS IN ALL PRINCIPAL CITIES IN THE U. S. A., CANADA AND OTHER COUNTRIES

THIS NAME ASSURES YOU OF QUALITY PRODUCTS



Hold tight, Kiddies, the safety boys are at it again, and as usual making plenty of sense!



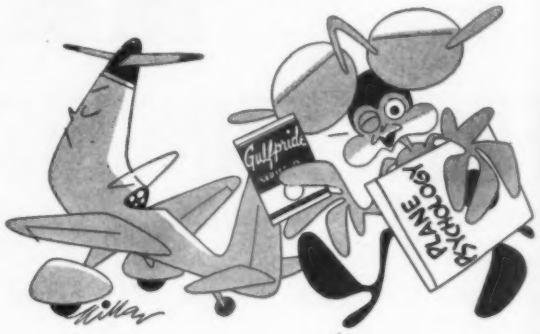
This time it's shoulder harnesses, those ingenious little devices that keep a pilot from folding up like a Parker House Roll if he crashes.

Sure, your safety belt will reduce the danger of an accident, but it can't hold a candle to a shoulder harness when it comes to over-all protection.

Now, let's assume you're coming in for a crash landing wearing a shoulder harness. Oops, watch that house, look out for those trees! CRASH!

See—what did we tell you! Instead of doubling up like a two-bit jackknife, you just sat there and let the harness take up most of the shock. And notice, Ferdie, your head's still against the seat instead of bumping against the instrument panel. Hey, Ferdie, speak to me!

But all kidding aside, shoulder harnesses are sure to reduce the seriousness of a good many mishaps!



AND ANOTHER THING!

Don't expect that power plant of yours to purr like a kitten on just any old oil.

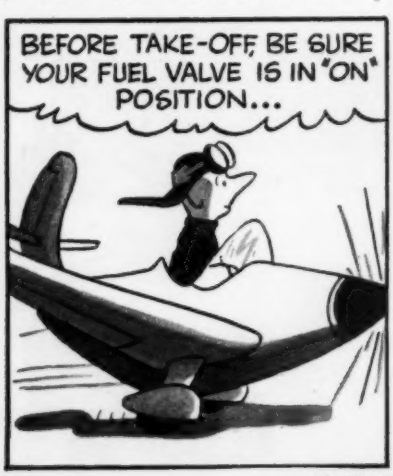
Use psychology! Gulfpride Aviation Oil—Series D—is the finest detergent dispersant oil for horizontally opposed engines in the world. It's seen in the best crankcases!

Pamper those valves and rings with the only aviation oil put through Gulf's exclusive Alchlor process to remove those extra carbon and sludge formers!

Dividends! Why, brother, use Gulfpride Aviation Oil—and increase those periods between overhauls up to 100%! Yes, 100%!

GULF

AVIATION PRODUCTS



Gulf Oil Corporation . . . Gulf Refining Company

Airports Total 6,403; Major Fields Gain

ALTHOUGH the total number of public civil airports in the country registered a small drop during 1950, the number of major airports (Class 4 and larger) showed a slight net gain.

Official figures tabulated by the Civil Aeronautics Administration showed a gain of 11 airports of the Class 4 and larger size between January 1, 1950, and the first of this year, the increases being as follows: Class 4, from 447 to 452; Class 5, from 185 to 188; Class 6 and larger, 149 to 152.

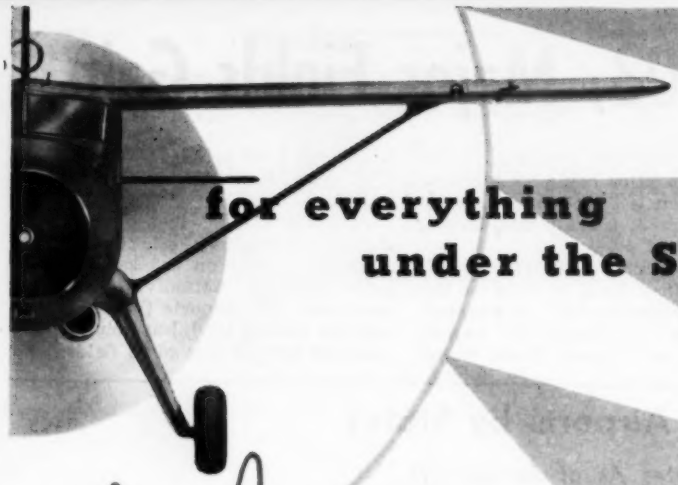
Smaller airports, on the other hand, dropped from a total of 5,703 at the beginning to 1950 to 5,611 at the start of this year, the changes by airport class being as follows: Class Sub-1 & 1, from 4,100 to 4,042; Class 2, from 1,027 to 994; and Class 3, from 576 to 575.

Airports of all classes as of last January 1 totaled 6,403, compared to a total of 6,484 on the same date a year previous. Actually, there were well over 100 airports that ceased to operate during 1950, but new airports reduced the net loss to 83 fields.

Classes of Airports by States

(CAA Figures As of January 1)

State	Sub-I & I		II		III		IV		V		VI & Over		Total	
	1951	1950	1951	1950	1951	1950	1951	1950	1951	1950	1951	1950	1951	1950
Alabama	45	47	14	16	13	13	11	12	2	1	2	2	87	91
Arizona	73	68	43	50	30	32	16	14	15	13	1	2	178	179
Arkansas	56	57	10	11	11	11	9	8	0	1	0	0	86	88
California	296	278	88	88	53	49	35	37	34	33	24	24	530	509
Colorado	57	57	23	23	20	20	1	1	0	2	6	6	107	109
Connecticut	23	25	1	1	3	3	4	4	1	1	0	0	32	34
Delaware	10	11	4	3	0	0	1	1	0	0	1	2	17	17
Dist. of Columbia	0	0	0	0	0	0	1	1	1	1	1	1	3	3
Florida	54	54	25	24	41	46	39	40	12	12	18	15	189	191
Georgia	52	64	18	17	23	24	24	22	2	3	5	4	124	134
Idaho	115	101	14	11	7	7	2	2	0	0	3	3	141	124
Illinois	109	113	46	42	8	5	9	9	4	4	0	0	176	173
Indiana	103	112	29	29	10	8	8	9	2	2	0	0	152	160
Iowa	148	152	16	19	6	4	8	7	0	0	1	1	179	183
Kansas	128	127	27	25	14	17	5	4	9	9	8	8	191	190
Kentucky	50	54	4	4	5	4	4	4	0	0	1	1	64	67
Louisiana	42	40	12	14	12	12	8	8	2	2	3	3	79	79
Maine	41	41	6	6	12	12	2	2	2	2	2	2	65	65
Maryland	26	24	15	14	4	5	7	6	0	0	3	2	55	51
Massachusetts	46	54	8	8	10	9	7	7	0	0	3	3	74	81
Michigan	176	173	42	48	14	14	12	11	2	2	2	2	248	250
Minnesota	76	83	34	31	6	7	4	4	1	1	1	1	122	127
Mississippi	46	48	13	17	14	12	8	9	1	0	1	1	83	87
Missouri	74	79	18	21	11	12	5	5	3	3	0	1	111	121
Montana	82	72	13	18	6	7	6	6	2	2	4	4	113	109
Nebraska	106	102	13	16	5	4	2	2	2	2	11	11	139	137
Nevada	39	28	6	7	12	11	9	10	9	9	1	1	76	66
New Hampshire	24	26	4	4	3	3	2	2	0	0	1	1	34	36
New Jersey	63	64	13	16	9	8	4	4	1	0	1	2	91	94
New Mexico	54	65	15	13	6	6	9	9	8	8	7	7	99	108
New York	190	206	30	29	12	11	16	14	5	5	2	2	255	267
North Carolina	88	96	17	14	19	18	11	12	2	2	4	4	141	146
North Dakota	112	107	14	15	3	5	8	6	0	0	0	0	137	133
Ohio	174	189	43	41	8	10	10	8	2	2	2	2	239	252
Oklahoma	90	89	22	25	12	12	13	13	7	6	3	3	147	148
Oregon	80	76	9	11	11	11	14	14	4	4	1	1	119	117
Pennsylvania	174	161	25	35	14	14	7	7	1	1	0	0	221	218
Rhode Island	7	6	1	1	1	2	1	0	2	2	0	0	12	11
South Carolina	25	28	13	13	3	4	11	11	6	6	3	3	61	65
South Dakota	49	51	9	6	6	5	3	3	2	2	2	2	71	69
Tennessee	38	46	13	16	5	5	6	6	2	1	0	0	64	74
Texas	371	392	114	114	49	54	49	52	25	25	11	10	619	647
Utah	23	22	15	15	13	13	3	4	5	5	1	1	60	60
Vermont	17	19	0	0	3	3	1	1	0	0	0	0	21	23
Virginia	82	83	19	17	10	10	11	11	2	2	2	2	126	125
Washington	113	116	25	23	11	10	17	17	5	5	7	7	178	178
West Virginia	43	46	8	7	2	2	3	3	1	1	0	0	57	59
Wisconsin	123	120	34	36	12	11	3	3	1	1	1	1	174	172
Wyoming	29	28	9	13	13	11	3	2	1	2	1	1	56	57
TOTALS	4,042	4,100	994	1,027	575	576	452	447	188	185	152	149	6,403	6,484



for everything under the Sun!

the busy BEAVER

THE *Spray* BEAVER

Super performance, 240 gal. capacity, plus dependability. The Beaver can operate profitably from any suitable field!

THE *Executive* BEAVER

Wide doors, high wing stability, plush interior for 6 people or cargo make the Beaver the choice for V.I.P.'S.

THE *Ski* BEAVER

Star routes, cargo can move all year from any field with the Beaver! Take off at 8400' is under 1000' at full gross load.

THE *Military* BEAVER

For liaison, ambulance, observation, rescue, arctic operations—look to the YL-20!

THE *Sea* BEAVER

Gross load 4820 lbs.; off the water in 8 sec.! Designed for safe docking and easy service—plus dependable P&W R-985 engine!

—from airlines to pleasure times, the versatile Beaver is busier than ever!

The unique construction and performance of the Beaver mean long hours of trouble-free flying—the tougher the assignment, the better! Built by DeHaviland, and backed by Babb, the Beaver is the buy for '51! Your nearest Babb Company office can arrange for a convincing flight demonstration!

*complete parts and service facilities for airframe and engine are available in the U. S.

THE BABB COMPANY, INC.

AVIATION BABB SALES — SERVICE

1007 Airway, Glendale 1, Calif. | 444 Madison Ave., New York 22, N.Y. | Newark Tidewater Terminal, Newark 5, New Jersey | 1346 Connecticut Ave., Washington 6, D.C. | Montreal Airport, Dorval, P.Q., Canada | 453 Herengracht, Amsterdam, Holland

Chicago Again Top Airline Center

Air carrier activities accounted for close to one-half of total landings and takeoffs at 25 leading terminal-type airports last year, despite the operation of larger and higher density aircraft.

The 1,881,811 air carrier aircraft movements represented 49.1% of the 15,971,052 operations at the 25 fields, an increase of 7.8% over the 1,801,418 operations in 1949. The latter figure was 41.3% of total aircraft movements for that year.

For the third consecutive year, Chicago had more air carrier traffic than any other airport in the country, moving far ahead of New York's La Guardia Airport, which had been just slightly behind it in 1949.

The 169,542 air carrier plane movements at Chicago last year represented 72.5% of total aircraft activity, representing 72.5% of all operations, as against 144,169 landings and takeoffs and 64.7% of total activity in 1949. La Guardia lost ground, with 140,640 air carrier aircraft movements in 1950, compared with 143,791 the year before.

Washington National Airport lost ground, too, dropping from 126,013 airline landings and takeoffs to 117,583. Miami moved up and nosed out Los Angeles for fourth place. Cleveland, Pittsburgh and Kansas City were among other cities showing fewer air carrier landings and takeoffs last year.

One new city made the list for the first time, and one in last year's top 25—Columbus, Ohio—dropped off. Charlotte, N. C. was the newcomer.

Air carrier plane movements last year at the 156 airports where CAA operates control towers totaled 4,001,947, as against 3,713,257 in 1949, an increase of 7.8%. The ratio of air carrier activity to total plane movements at the 25 fields was 49.1% last year. Air carrier activity last year represented 25.1% of all plane movements, compared to 22.0% the year before at all fields.

A decline in personal plane operations, flight instruction and other local civil flying was a significant feature of the overall airport traffic picture in 1950. Locally based civil aircraft accounted for 6,525,816 landings and takeoffs at the 168 airports last year, a drop of 15.5% from the 7,724,373 movements of 1949.

Aircraft Operations at 25 Leading Airports*

(1950 Compared With 1949)

1950 Ranking	Air Carrier Operations	% of Total Operations	1949 Ranking	Air Carrier Operations	% of Total Operations
1. Chicago (Municipal)	169,542	72.5	1	144,169	64.7
2. La Guardia	140,640	89.6	2	143,791	78.1
3. Washington	117,583	75.2	3	126,013	72.8
4. Miami	103,805	49.4	5	93,920	44.4
5. Los Angeles	101,254	58.7	4	97,682	54.0
6. Detroit (Willow Run)	88,035	79.1	7	85,408	77.1
7. San Francisco	82,151	67.9	8	78,332	61.1
8. Dallas	81,821	51.8	10	70,835	48.9
9. Pittsburgh	80,843	39.7	6	85,935	41.6
10. Boston	77,567	65.6	12	66,734	62.1
11. Philadelphia	75,540	53.5	11	69,455	53.1
12. Newark	74,761	66.2	13	65,370	59.5
13. Cleveland	74,590	29.3	9	76,215	23.9
14. Atlanta	70,561	35.6	15	61,846	33.1
15. Kansas City	59,840	38.8	14	61,861	30.9
16. Jacksonville	57,043	50.2	16	57,277	43.5
17. Oakland	53,782	27.7	18	52,109	20.7
18. St. Louis	51,224	25.6	17	52,780	21.6
19. Indianapolis	48,337	33.3	22	43,262	23.3
20. Minneapolis	48,118	30.3	19	51,488	21.9
21. Louisville	47,679	62.5	21	44,226	44.0
22. Denver	47,005	33.7	20	47,204	29.7
23. Cincinnati (Covington)	44,615	65.0	23	43,018	56.1
24. Houston	44,033	37.7	24	41,989	40.3
25. Charlotte	41,442	43.4	27	38,880	34.5
TOTALS	**1,881,811**	**49.1**	..	**1,801,418**	**41.2**
Totals for all CAA towers in 1949	4,001,947	25.1	..	3,713,257	22.0

* Landings and take-offs.

lockheed

California Calling engineers

There's a better life waiting for you and your family in Southern California—at Lockheed. Here, in beautiful, sun-swept San Fernando Valley, you find living and working conditions beyond compare.

So why not enjoy both your work and your life in Southern California? Lockheed's long-range production program has created many new openings. Engineers are needed immediately on commercial and military aircraft.

What's more, higher salary rates are now in effect. Lockheed also offers generous travel allowances to those who qualify. Full pay if additional training necessary.

Positions now open include:

Electronics Engineers
Aircraft Design Engineers
Stress Engineers and Analysts
Production Design Engineers
Engineering Technical Writers
Flight Manuals Engineers
Aircraft Equipment Engineers

Send today for free illustrated booklet, describing the wonderful living and working conditions at Lockheed in Southern California. Use handy coupon below.

Mr. John Hare
Salary Supervisor
Lockheed Aircraft Corporation, Plant B-1
Burbank, California

Please send me your free illustrated booklet describing *the better* living and working conditions at Lockheed.

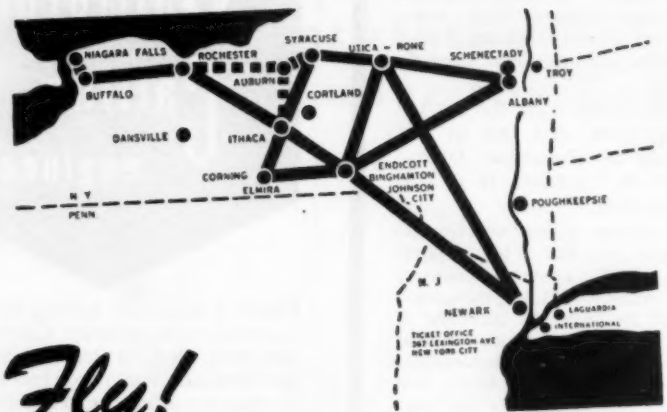
Name

Street Address

City and State

LOCKHEED
AIRCRAFT CORPORATION

IN NEW YORK STATE



Fly!

ROBINSON AIRLINES

ROUTE OF THE AIR CHIEFS

just for the record...

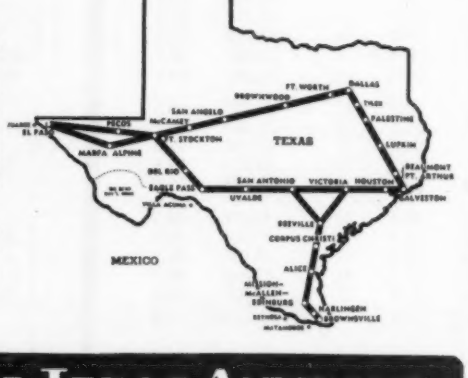
AND WHAT A RECORD!

T.T.A. is now the largest local carrier flying exclusively in the largest state

SERVICE TO THIRTY TEXAS CITIES, four border points. Air mail, passenger and freight service to 34 communities . . . exclusive service to 20.

DAILY COMMUTER SERVICE FROM VALLEY to large metropolitan areas . . . Daily round-trip flights to and from Houston, San Antonio, and Corpus Christi.

SAVINGS ON FARES . . . Family Plan, Special Excursion Rates, 20% reduction on return portion of Round-Trip ticket.



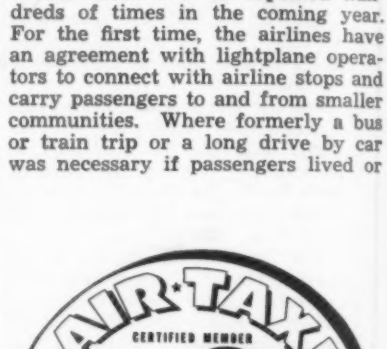
TTA **TRANS-TEXAS AIRWAYS**

New Air Taxi Servi

By BARBARA J. WARD

AS THE AIRLINER begins to unload its passengers, a lightplane taxis into position nearby. The passenger hesitating at the foot of the unloading ramp is met by a man in a business suit. "Mr. Brown? Your air taxi is over here, sir. We'll pick up your luggage and be on our way."

This scene will be repeated hundreds of times in the coming year. For the first time, the airlines have an agreement with lightplane operators to connect with airline stops and carry passengers to and from smaller communities. Where formerly a bus or train trip or a long drive by car was necessary if passengers lived or worked in outlying communities, passengers can now go by air all the way.



FLYING KANGAROO
Official NATC Insignia

The National Air Taxi Conference started actual air taxi operations February 12 and is just getting under way in many states. About 30 of the 60 fixed-base operator applicants have so far been approved, but by the middle of summer, NATC anticipates a hundred operating air taxi members. Qualifications are high, but once an applicant has met all the requirements, he is a part of one of the newest and most promising fields of lightplane operation.

Some 50,000 folders explaining the air taxi operations were recently distributed to the sales personnel of the 28 airlines which have signed the NATC working agreement. These folders are already appearing on airline reservations counters and reservations personnel are checking the names and locations of air taxi operators in the *Official Airline Guide* and explaining to passengers that air taxis will meet airline flights when so requested to carry passengers to

Taxi Service Begins

the local airport nearest their destination. By means of air taxi, airline travel can be extended into over a thousand additional communities having Class 1 airports.

Both the airlines and local operators foresee increased business as a result of the air taxi agreement between the airlines and the operator members of NATC. Whereas two hours of driving is required to reach LaGuardia Field or New York International Airport from residential areas in New Jersey, businessmen can reach the airports via an air taxi in about 20 minutes.

Not only will it mean a saving in time, but it may mean the difference between a passenger's taking the train or taking the airlines. A man who has to take the train or bus to reach the airport is tempted to continue his trip by the same means and avoid the confusion of changing transportation systems. The air taxi carries him straight to the airline ramp; he doesn't even have to walk through the airport terminal building.

What's In It?

There are good reasons why air taxi is a sound venture for any operator with a two-place or larger aircraft and a pilot to take it cross-country on demand. To begin with, the airlines are working with NATC. Airline reservations personnel become in effect NATC agents, will explain the service to passengers and will contact the air taxi operator and notify him to meet the airliner. The passenger is required to pay the airlines a $10 deposit on the air taxi portion of his trip, which is noted on the airline exchange order given him as his reservation form and is later collected from the airline by the air taxi operator. The airline pays for any phone calls, etc., made from the reservations counter to contact the air taxi operator.

No Commission Yet

In turn, the NATC operator becomes the airlines' representative in his local community. He is authorized to make airline reservations for passengers originating at outlying communities and phones or wires the airline at his own expense to confirm the reservations. On receiving confirmation, he fills out a reservations blank for the passenger and schedules the air taxi portion of the trip to link with the airline departure time. No provision has been made for commissions on the airline reservations sold, but in time such a provision might be worked out.

Perhaps the most important benefits from air taxi operations will accrue to the operator indirectly. As

The South's Local Service Airline

•

SERVING 31 LEADING CITIES IN 8 SOUTHERN STATES

Southern AIRWAYS

GENERAL OFFICE:
BIRMINGHAM, ALABAMA

SALES OFFICE:
ATLANTA, GEORGIA

Flying your way EVERY DAY!

CENTRAL AIRLINES

KEITH KAHLE—
President and General Manager
DONALD EHRHART—
Vice-President; Administration
R. E. HARDING Jr.—
Vice-President; Operations
General Offices: 6109 Camp Bowie Boulevard
Fort Worth, Texas

Development Engineers for Electronic Aircraft Armament

ELECTRONIC INSTRUMENTATION • ELECTRONIC COMPONENTS • SERVOMECHANISMS • RADAR • ELECTRONIC PACKAGING • CALIBRATION AND TESTING ENGINEERS FOR PRODUCTION

Job openings range from recent graduates to Engineers with years of experience. Send complete resume, listing salary requirements and availability, to:

Technical Employment Supervisor, Station 483

THE EMERSON ELECTRIC MFG. CO.
8100 Florissant • St. Louis 21, Missouri

LEADERS IN THE ELECTRICAL INDUSTRY SINCE 1890

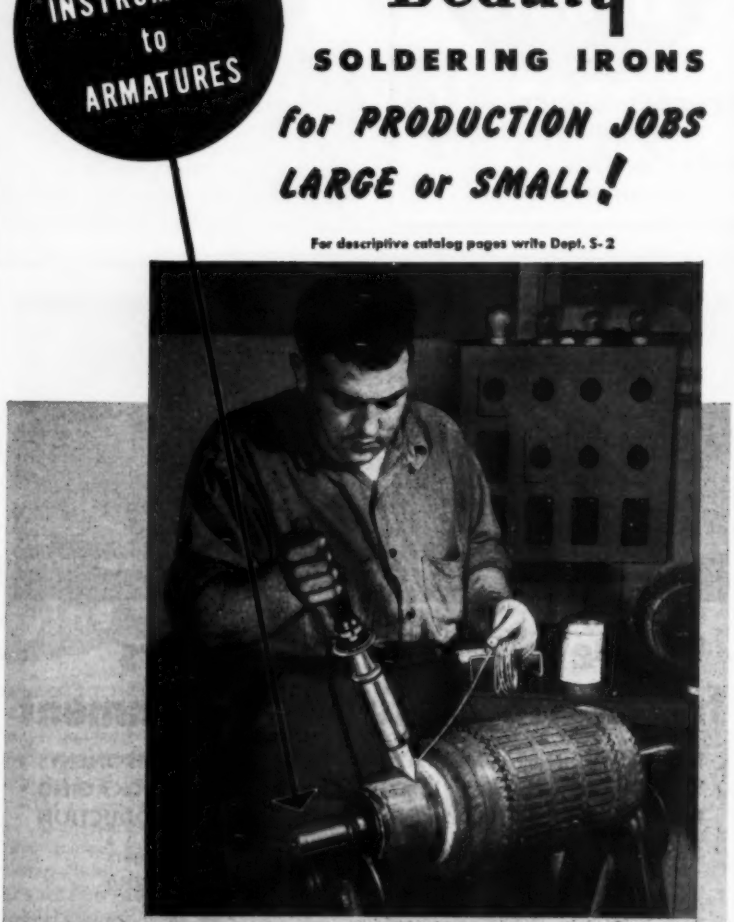
from INSTRUMENTS to ARMATURES

American Beauty

SOLDERING IRONS

for PRODUCTION JOBS LARGE or SMALL!

For descriptive catalog pages write Dept. S-2



DEPENDABLE • DURABLE • EFFICIENT • SINCE 1894

AMERICAN ELECTRICAL HEATER CO.
DETROIT 2, MICH.

120

the airlines representative in his community, he will gain status and his name can be linked with the airlines in advertisements to give him valuable publicity. Too, as passengers become accustomed to and accept air travel in two-to-four place aircraft, the potential charter business of the community will increase.

Membership Requirements

Operators must meet high standards of both equipment and operating practices before they can be accepted for NATC operations. The size of aircraft is not important; the airlines are quite willing to see two-place aircraft, which appear most economical for short hops, used in air taxi.

However, applicants must meet the National Air Taxi Conference Code of Operating Practices and Ethics which includes provisions for safety, instruction of employees, refuelling provisions, fire equipment required on the ramp, and an established inspection and maintenance plan. Operators are required to carry $40,000 passenger liability insurance per passenger seat and, in addition, NATC takes out a surety bond on each applicant for NATC membership. This requires investigation and approval by the bonding company before membership can be granted.

Aside from meeting these provisions, any small irregular carrier which holds a proper CAB letter of registration and a CAA operating certificate may become a member on payment of an application fee of $25 and yearly dues and an agreement to abide by the code of operating practices and ethics.

28 Operators

The 28 air taxi operators who were certified members of NATC as of mid-February were:

Aeroservice, Inc., Omaha, Neb.
Air Service, Inc., Akron-Canton, Ohio.
Albany Air Services, Inc., Albany, Ga.
Aviation Center, Inc., Cincinnati, Ohio.
Bowman Flying Service, Inc., Keene, N. H.
Central Flying Service, Little Rock, Ark.
Clinton Aviation Co., Denver, Colo.
Dixie Air Associates, Inc., Memphis, Tenn.
Elliott Flying Service, Davenport, Ia.
Hunter Flying Service, Cedar Rapids, Ia.
Lehigh Aircraft Co., Allentown, Pa.
Pacific Air Taxi, Burbank, Calif.
Purdue Aero Corp., Lafayette, Ind.
Reading Aviation Service, Inc., Reading, Pa.
Red Bank Airport, Inc., Red Bank, N. J.
Rent-A-Plane Sky Taxi, Tulsa, Okla.
Richland Aviation, Inc., Mansfield, Ohio.
Skyhaven, Inc., Laconia, N. H.
Sky Travel, Inc., Cleveland, Ohio.
Somerset Air Service, Inc., Somerville, N. J.
Southern Airways Co., Birmingham, Ala.
Southern Flight Service, Inc., Charlotte, N. C.

Stuckey's Flying Service, Ruston, La.
Tri-State Aviation, Inc., Washington, Pa.
Van's Air Service, Inc., St. Cloud, Minn.
Ventura Airpark, Ventura, Calif.
Wiggins Airways, Boston, Mass.
Wings, Inc., Philadelphia, Pa.

Lively Market Looms For Executive Planes

SHIPMENT of four- and five-place planes stayed about the same during 1950 as in 1949, with over 2,300 airplanes delivered. Manufacturers believe that, if materials are available, lightplane production will increase at least 25% in 1950.

The backlog at the close of 1950 was much higher than in 1949 and included 30 of the smaller executive-type airplanes. Many additional orders were placed in the early months of 1951 and usage figures on the smaller executive plane are remaining at the relatively high level of 1949 and 1950.

This year the largest user of aircraft is expected to be the aviation industry itself with over 35,000 planes. Next largest group of owners, CAA reports, are those engaged in agriculture—1951 should see 6,000 planes in use. Next come the auto and garage service trades with over 5,000 planes in use; and professional men, lawyers, doctors, etc., who own and use over 4,000. Wholesale and retail trades command a fleet of planes of almost 4,000. State and local governments fly over 3,000 aircraft. The petroleum industries, transportation and public utilities, and construction industries follow with over 2,000 planes each.

Industry Report

Major producers of four- and five-place airplanes report the following plans:

- **Cessna Aircraft Co.** continuing production of "170", "190" and "195" planes.
- **Civil Navion production** cancelled in March as soon as 150 orders were filled.
- **Beechcraft Bonanza B-35** models are still in production.
- **Piper Aircraft Corp.** is continuing normal production and introducing a new version of the Piper Pacer—the Tri-Pacer.
- **Aircraft Mfg. Co.** of Tyler, Tex. reports no difficulty in obtaining materials for manufacture of the Texas Bullet model 205.

Used market on Upswing

The used aircraft market is off on a definite spring upswing. Even planes of 1937 to 1940 manufacture

California cities only minutes apart

FROM **LA** AND **SF** TERMINALS . . .

via ***Southwest Airways***

California's local service air line *connecting with*

American Airlines
Pan American World Airways
Trans World Airlines
United Airlines
Western Airlines
and
West Coast Airlines
(local service in Oregon and Washington)

PRECISION DROP FORGINGS
for AIRCRAFT use
Produced to your specifications . . . from alloy, stainless, and carbon steels . . . aluminum, brass, bronze, and copper . . . with forging dies and tools made in our own plants.
CONSOLIDATED INDUSTRIES
INCORPORATED
West Cheshire, Conn.

FOR YEARS, THE ACCEPTED
NEW YORK
"HEADQUARTERS"
OF AVIATION EXECUTIVES

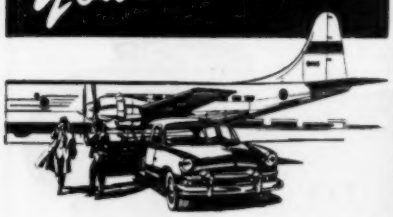
Hotel Lexington
LEXINGTON AVENUE AT 48th ST., N. Y. C. 17
HOME OF THE Hawaiian Room

THE SOUTHWEST
is near
when you
fly PIONEER

Serving the key military installations of the Southwest

PIONEER
AIR LINES

Your car, sir...



• More pleasure—more production from your business or pleasure trips when you take advantage of the Avis Auto Plan. Enjoy the convenience of a car of your own—away from home. Make more business calls—visit friends—inexpensively! Average rate is $5.00 per day plus 7c per mile—for a late model car—fully insured. Enjoy a day—a week—or as long as you like. Avis service is available at nearly all principal airports, and in more than 120 cities throughout the world.

The world's largest airport car rental system!

AVIS RENT-A-CAR

AVIS RENT-A-CAR SYSTEM

MAIN OFFICE
12625 GRAND RIVER
DETROIT, MICHIGAN

Additional Avis Franchises Being Awarded . . . Inquiries Invited.

DINKLER HOTELS

in ATLANTA
The Dinkler-Ansley
Joe Crocy, Manager

in BIRMINGHAM
The Dinkler-Tutwiler
Ira M. Patton, Manager

in NEW ORLEANS
The St. Charles
J. J. ("Mike") O'Leary,
Vice President and Manager

in NASHVILLE
The Andrew Jackson
Leon Womble, Manager

in MONTGOMERY
The Dinkler-Jefferson Davis
Homer Spiva, Manager

Executive Offices: Atlanta
Carling Dinkler, President
Carling Dinkler, Jr.,
Vice Pres. and Gen. Mgr.

command good prices. According to late information on used aircraft sales:

• **The Beech D-17S** manufactured 1937-1941 brings from $5,000 to $6,000.

• **Bellanca 1946 and 1947** models vary between $2,500 and $3,800. 1948 and later are scarce and higher.

• **Fairchild prices** for four-placers are from about $1,000 for a 1940 F-24 to $4,000 for the 1946 "24".

• **Navions** are being offered at about $5,000 for North American-manufactured ships to $16,000 for a late '51 Super 260. 1947 and 1948 Navions are between $6,000 and $7,000; 1949 models are $9,200 to $10,000.

• **Bonanza 35's** are about $6,000 generally with most 1947 and 1948 models at between $7,000 and $8,000. A-35's run from $8,500 and $10,000 as the rule.

• **Cessna 170's 1949 and 1950** are between $5,000 to $6,000 with late models bringing a bit more and 1948 170's around $3,500 to $4,000. Few 190's are advertised.

• **Piper Clippers** are around $2,400 and Pacers are over $4,000.

• **Stinson 1948** models range from $2,700 to $3,700 and 1947 models average $2,700.

With the possibility of war, most four- and five-place aircraft owners are thinking seriously of the last war's crowded airlines, delayed air express, and the possibility of being "bumped" at every turn. It may be just the spring market that is increasing used plane values and increasing 4-place usage, but it is more likely that businessmen and corporations are becoming more aware that the multi-place ship is a valuable source of reserve transportation.

Want New Supply Sources?

See page 89

BOEDY'S ALBUM

M. "Rene" Glerum
Transcontinental & Western Air
at Columbus, Ohio
July 28, 1939

Laura Cooke
American Airlines
Newark—Detroit
August 2, 1939

E. J. "Ed" Goeringer
American Airlines
at Buffalo, N. Y.
August 2, 1939

T. L. "Tommie" Boyd (QB)
American Airlines Inc.
Newark—Detroit
August 2, 1939

L. H. "Bid" Bidwell
American Airlines
Newark—Detroit
August 2, 1939

Humberto Gal'Lino
Peruvian Air Force
at Detroit, Mich.
August 2, 1939

Victor Gal'Lino
Peruvian Air Force
at Detroit, Mich.
August 2, 1939

R. B. "Bob" Oppenheimer
Barkley-Grow Aircraft
Detroit, Mich.
August 2, 1939

Tom Towle
Kay Products Co.
Detroit, Mich.
August 3, 1939

Charles N. Robson
Mercury Air Service
at Wayne, Mich.
August 3, 1939

Grace Nichols
Stinson Aircraft
Wayne, Mich.
August 3, 1939

E. W. "Gene" Campbell
Stinson Aircraft
Wayne, Mich.
August 3, 1939

Stanley E. Knauss
Kay Products Co.
Detroit, Mich.
August 3, 1939

Jane R. Morey
American Airlines
Detroit—Chicago
August 3, 1939

Margaret Freer
American Airlines
Chicago—Newark
August 4, 1939

W. K. "Bill" Owen
American Airlines
Chicago—Newark
August 4, 1939

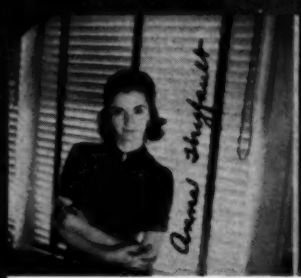
BOEDY'S ALBUM

Wm. McD. Ritchie Krause
Douglas Aircraft Co.
Paterson, N. J.
August 8, 1939

Olive Thompson
American Airlines
Newark-Nashville
August 8, 1939

Lois Smith
American Airlines
Nashville-Ft. Worth
August 9, 1939

Hugh Gallemore
American Airlines
Fort Worth, Texas
August 9, 1939

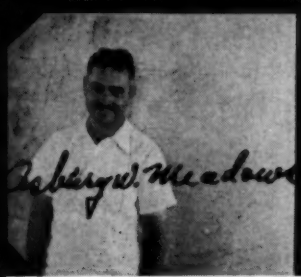


Anne Thyfault
Braniff Airways
Dallas, Texas
August 9, 1939

Claude G. Adams
Braniff Airways
Dallas, Texas
August 9, 1939

N. B. "Bert" Ison (QB)
Civil Aeronautics Authority
Dallas, Texas
August 10, 1939

Norma H. Click
U. S. Army Training
Dallas, Texas
August 10, 1939



Asbury W. Meadows (QB)
Civil Aeronautics Authority
Dallas, Texas
August 10, 1939

Hugh A. Drane (QB)
Hugh Drane Industries
Dallas, Texas
August 10, 1939

Glenn E. Messer (EB-QB)
Glenn E. Messer Co.
Dallas, Texas
August 10, 1939

D. E. "Dan" Hooks
U. S. Army Air Corps
Dallas, Texas
August 10, 1939

Esther Carlson
American Airlines
Dallas-Newark
August 11, 1939

R. "Ren" Eberhardt
Harrison Radiators
Paterson, N. J.
August 11, 1939

Milton J. "Kit" Kittler
Holley Carburetors
Paterson, N. J.
August 11, 1939

Walter Haycock
Wright Aeronautical Corp
Paterson, N. J.
August 18, 1939

Candid snapshots from the famous collection of Kenneth

WORLD'S PREMIER AIRPLANE FABRIC

lighter stronger smoother

FLIGHTEX

FLIGHTEX FABRICS, Inc. · 93 WORTH STREET · NEW YORK 13, N.Y.

Leading Manufacturers of Fabric and Tapes for the Aircraft industry.

FLIGHTEX FABRIC

Export Representative
AVIQUIPO, Inc.
25 Beaver Street, N. Y.
Cable: Aviquipo

BETWEEN THE MIDWEST AND THE BUSY SOUTH ATLANTIC STATES

PIEDMONT Airlines

HOME OFFICE AND OPERATIONS BASE
Smith Reynolds Airport
Winston Salem
North Carolina

the bulletin board

Undisplayed Advertising: $1.00 per line, minimum charge $4.00. Cash with order. Estimate 30 capital letters and spaces per line; 40 small lower-case letters and spaces per line. Add two lines if Box Number is included in lieu of advertiser's name and address.

Displayed Advertising: $10.00 per inch for less than 15 inches in one issue or in any 12-month period. For more than 15 inches, $8.50 per inch; more than 30 inches, $8.00; more than 60 inches, $7.50; more than 90 inches, $7.00; more than 120 inches, $6.50. Space units up to full pages accepted in this section for classified-type advertising.

Forms close 20 days preceding publication date. Address all correspondence to Classified Advertising Department, AMERICAN AVIATION PUBLICATIONS, 1025 Vermont Ave., N. W., Washington 5, D. C.

FOR SALE

FOR SALE—Seats, standard Douglas DC-3. 72 doubles, 72 singles. Beautifully upholstered in brown whip cord. New condition. Also, head rest covers, spare upholstery suits, spare seat parts, nine complete sets of flooring with widget fasteners and fixtures for Douglas seat installation, floor intercostals and seat side attach rails for nine aircraft, 21 or 24 seat arrangement. Southwest Airways Company, P. O. Box 268, So. San Francisco, Calif.

Wanted: P & W R1340-AN1 engines, engine parts, accessories, AT-6 propellers, blades or airframe parts. Will take any quantity, paying good price. Write, wire, phone, Citrus 1-5128. Carl Turner, 1007 Airway, Glendale, California.

Wanted: BTs, with P & W R985 engines only. Will pay highest market price, whether you have one or hundred, either flyable or non-flyable. Write, wire, phone. Citrus 1-5128. Carl Turner, 1007 Airway, Glendale, California.

WANTED — AIRCRAFT PARTS
AN fittings & hardware Electrical parts
Pulleys & bearings Engine parts
Accessories & components Instruments
Aircraft material of every nature
Will purchase complete inventories or individual items. Send your listings or samples to:
COLLINS ENGINEERING COMPANY
9054 Washington Blvd. Culver City, Cal.

POSITIONS WANTED

ATR PILOT 8 yrs. with major airline desires position on executive-type aircraft. Reply Box 125, Toluca Lake Station, N. Hollywood, Calif.

AVAILABLE Former District Sales Manager Rocky Mountain Air Line 9 years; owned Travel Agency last 12 months; desires represent Air Line off Line Capacity in Rocky Mountain Area. Reply Box No. 712, AMERICAN AVIATION Magazine, 1025 Vermont Avenue, Washington 5, D. C.

HELP WANTED

A and E Mechanics wanted. Union scale wages. Contact Superintendent of Maintenance, Wisconsin Central Airlines, Inc., Municipal Airport, Madison, Wisconsin.

WANTED: Communications Supervisor possessing airline background capable of full charge operations communications program and electronics research and development in small airline. Reply Box No. 709, AMERICAN AVIATION Magazine, 1025 Vermont Ave., Washington 5, D. C.

CO-PILOT VACANCIES

SOME BASIC QUALIFICATIONS:

1. College training. 2. Military experience. 3. Minimum 750 hours flight time. 4. CAA Commercial & Instrument Rating. 5. U. S. Citizen. 6. Willing to accept overseas assignment.

APPLY PERSONNEL OFFICE
PAN AMERICAN WORLD AIRWAYS
La Guardia Field, New York

A New Approach
To Air Navigation

Halpin FLIGHT AND ROUTE PLAN COAIRDINATOR

The best, most highly recommended POCKET-SIZE computor meets every need in simplifying cross-country navigation and the all-important first step every pilot must take—FLIGHT PLANNING! **$3.50** each

Incorporated are a weather code analysis; the latest VFR, IFR and DVFR regulations, together with all incidental information required for filing a flight plan.

Here is a disc computor which solves swiftly all problems of in-flight analyses; time intervals; fuel consumption and conversion units of measurement including nautical miles. Aeronautical chart scales on edges.

Designed in accordance with the LATEST Civil Air Regulations including DEFENSE AREA restrictions. Best of all, you carry in your pocket a regulation CAA Flight Plan form to be filled out—and erased—again and again and again.

HALPIN COAIRDINATOR
P. O. Box 65—AA Lambert Field 21, Mo.
•T.M. Reg. U. S., CAN., & MEXICO

HALPIN COAIRDINATOR CO.
P.O. Box 65—AA, Lambert Field 21, Mo.
Gentlemen: Please send .....Flight and Route Plan Coairdinators to me. $..... enclosed to cover full cost including shipping.
Name .....
Address .....
City ..... Zone..... State.....

ENGINEERS

KAMAN AIRCRAFT CORPORATION

offers you unusual opportunities to secure your future with a young and growing organization. Long range program developing and producing new types of helicopters for the military services.

Excellent suburban working and living conditions. Compensation for extended work week. Top rated educational, cultural and recreational facilities.

ROTOR DESIGNERS
POWER TRANSMISSION DESIGNERS
AIRCRAFT CONTROLS DESIGNERS
ENGINE INSTALLATION DESIGNERS
AIRFRAME DESIGNERS
ROTOR STRESS ENGINEERS
LOFTSMEN
DRAFTSMEN (Layout-Checking)
PRODUCTION PLANNERS
TOOL, JIG and FIXTURE DESIGNERS

Send detailed resume to

PERSONNEL MANAGER
THE KAMAN AIRCRAFT CORPORATION
WINDSOR LOCKS, CONNECTICUT

ENGINEERS

STRESS ANALYSTS - WEIGHTS ENGINEERS
LAYOUT DRAFTSMEN

NOW THERE ARE EXCELLENT OPPORTUNITIES FOR EXPERIENCED, PROFESSIONAL MEN AT SIKORSKY AIRCRAFT

LEADING PRODUCER OF HELICOPTERS FOR YOUR ARMED FORCES OFFERS YOU THESE ADVANTAGES:

Immediate Openings, Attractive Salaries, Well-Equipped Plant, Friendly Working Conditions

And Above All—excellent opportunities for advancement while working in association with top engineers in an outstanding engineering firm which is producing the most widely used and thoroughly proven helicopters for your armed forces.

Don't Miss This Opportunity! Send a resume of your experience today to Mr. R. C. Banks, Personnel Manager, Sikorsky Aircraft, Bridgeport 1, Connecticut.

SIKORSKY AIRCRAFT

Division of United Aircraft Corporation

BRIDGEPORT 1, CONNECTICUT

new and used DC-3 and DC-4 parts, equipment and accessories! at below cost!

DC-3, DC-4 and P. & W. R-1830 and P. & W. R-2000 parts, accessories and components; also newly overhauled P. & W. 1830-92 engines and quick change units, contact:

Surplus Sales Representative, United Air Lines Maintenance Base, Bayshore Highway, South San Francisco, Calif. Telephone JUno 8-2424.

Prompt delivery. Guaranteed to be as represented.

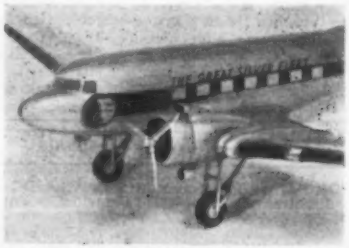
For a complete list of all parts, write to above address. Send us your requests for quotations.

UNITED AIR LINES

CUSTOM-BUILT SCALE DISPLAY MODELS

Precision constructed models completely finished in every detail with controls in outline form, scale propellers, and with windows and doors painted in.

Constructed from top grade wood and painted in glossy lacquers, these miniatures make ideal personal and business gifts, and are tops for collector's items.

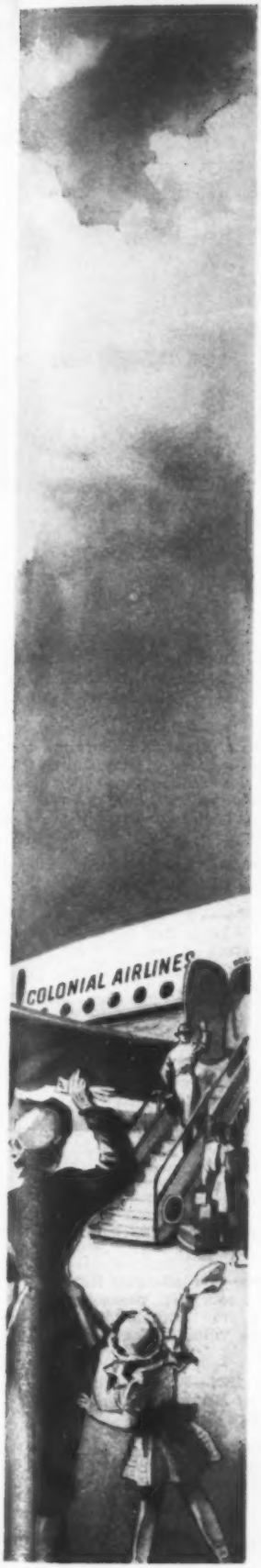


22" Douglas DC-3 completely finished as shown above, or with any standard airline insignia and markings $50.00

26" Douglas DC-4, DC-6 or C-47	60.00
35" Boeing Stratocruiser	125.00
30" Lockheed Constellation	75.00
28" Martin 2-0-2 or 4-0-4	75.00
22" Convair-Liner or Martin 4-0-4	50.00
17" Lockheed 18 or Beech D-18	40.00
16" F-5I, F-82, F4U-1, F6U-1 or F-80 ..	30.00
13" Lockheed "Lightning" P-38	30.00
14" Bell, Sikorsky or Hiller Helicopter	30.00

Please specify color scheme and markings desired. Allow at least 15 days for delivery. Models shipped by express shipping charges collect and insured. Cash with order; or ¼ down, balance C.O.D. Optional: Mounting pedestal for 16" models, $5.00; for larger models $10.00.

CHRISTIE BATLAS & CO.
P. O. BOX 160-GH MORGANTOWN, W. VA.



SAFETY

is the first consideration of the entire Air Transportation Industry. Colonial Airlines is therefore proud of its enviable record–unsurpassed in the history of Transportation

21

CONSECUTIVE YEARS OF SERVICE WITHOUT A SINGLE FATAL ACCIDENT!

We, in Colonial Airlines, are proud of this achievement, which can only be attributed to the teamwork, devotion and deep-rooted sense of responsibility of all of Colonial's personnel to the air-travelling public.

Colonial Airlines together with every one of its employees, pledges to make every effort to continue into the years ahead its enviable record of safety and its contribution to the world pre-eminence of our great American air transportation industry.

Sigmund Janas

President,
Colonial Airlines

COLONIAL AIRLINES

Route of the Skycruisers

CANADA • USA • BERMUDA

Historic Occasion— Stage coach once used for carrying mail between Spokane and Pasco, Wash., took part in ceremonies at the Pasco airport on Apr. 6, 1926, when this Swallow biplane, owned by Varney Air Lines, a predecessor company of United Air Lines, took off on a pioneer contract mail flight between Pasco and Elko, Nevada. Varney was first of the five original air mail contractors to begin service.

When U. S. Air Service Began

SCHEDULED air transport service in the United States had its origin in February, 1926, or in April, 1926, depending on the point of view and method of reckoning—in any case making 1951 the silver anniversary date of the airline industry.

Ford Air Transport was credited with carrying the first domestic air mail under private contract between Detroit and Cleveland in a single-engined Stout plane.

Of existing airlines, both Western Air Lines and United Air Lines date their original service back to April, 1926.

Western's Start— When Western Air Express (now Western Air Lines) made its first contract air mail flight on April 17, 1926, half a dozen sacks of mail weighing less than 200 pounds constituted almost a full load for its Douglas M-2 biplane, shown here at the carrier's Los Angeles headquarters.

A brief chronology of the beginnings of domestic airline operations follows:

Feb. 15, 1926—Ford Air Transport (later became Stout Air Services and finally became part of the United Air Lines) carries first domestic air mail under private contract, Detroit to Cleveland, in newly-designed single-engined Stout plane.

Apr. 1, 1926—Florida Airways begins service Atlanta-Jacksonville.

Apr. 6, 1926—Varney Air Lines (now a part of UAL) is first of five original mail contractors to begin service, flying from Elko, Nev., to Pasco, Wash.

Apr. 15, 1926—Robertson Aircraft Corp. begins mail service, St. Louis to Chicago.

Apr. 17, 1926—Western Air Express (now Western Air Lines) begins mail service, Los Angeles to Salt Lake City.

May 12, 1926—National Air Transport (now part of UAL) begins mail service, Chicago to Dallas.

June 7, 1926—Charles Dickinson (later taken over by Northwest Airlines) begins service between Chicago and Twin Cities.

July 6, 1926—Philadelphia Rapid Transit airline, carrying passengers from Washington to Philadelphia World's Fair, teaches valuable lessons in airline operations.

Sept. 15, 1926—Pacific Air Transport (now part of UAL) begins mail service, Seattle to Los Angeles.

Oct. 1, 1926—Northwest Airlines succeeds Charles Dickinson in operation of Chicago-Twin Cities route.

Bold Venture

A Salute to WESTERN AIR LINES

on its 25th Anniversary...

Western Air Lines made its first flight . . . from Los Angeles to Salt Lake City . . . on April 17, 1926. Western is 25 years old this week . . . the first airline in the United States to complete 25 years of continuous operation. From its original 651 mile route, Western's system has grown into 5000 miles of routes serving 13 western states and Canada.

21 years ago, just a few short years after this bold and venturesome beginning, Connecticut General issued group life insurance for Western, protecting all its personnel, including pilots, without flight restrictions. This was the first time such insurance had been issued. The step was only one of the many pioneering moves which Connecticut General has made in liberalizing both life and accident insurance, both on a group and individual basis, for those who fly.

Today, the personnel of 32 airlines are protected by Connecticut General group plans.

WESTERN AIR LINES 1926 25th 1951 ANNIVERSARY

A Pioneer in Group Insurance
And in Insurance for Those Who Fly

CONNECTICUT GENERAL
LIFE INSURANCE COMPANY
HARTFORD, CONNECTICUT

LIFE • ACCIDENT • HEALTH • GROUP INSURANCE • PENSION PLANS

33 Cities and 16 years...

Thirty-three *important* cities – from New York to Miami...from New Orleans to Havana, Cuba – lie along the route served by National Airlines, the Airline of the Stars.

In its 16 years of operation, National Airlines has become *known* for fine equipment, fast flying time, passenger comfort, and courteous service. *All* of these are provided to the *highest degree* in National's famed STAR flights – DC-6 Luxury PLUS!

Airline of the Stars

NATIONAL ☆ Airlines

FLY C&S NEW Luxury CONSTELLATIONS

TO THE LEADING CITIES OF THE MISSISSIPPI VALLEY AND THE CARIBBEAN

SHORTEST ROUTE– FASTEST SERVICE FROM CHICAGO TO HOUSTON AND NEW ORLEANS

CHICAGO & SOUTHERN AIR LINES

General Offices Memphis 2, Tenn.

Advertisers In This Issue

ADVERTISERS	Page
A	
Air Associates, Inc.	67
Aircraft Engine and Parts Corporation	42
Aircraft Radio Corporation	81
Air France	90
Airwork Corporation	50
All-American Airways, Inc.	84
Allison Radar Corporation	44
Frank Ambrose Aviation Company, Inc.	77
American Chemical Paint Company	75
American Electric Heater Company	110
Ansul Chemical Company	103
Avica Corporation	36
Avis Airlines, Rent-A-Car	112
B	
The Babb Company	106
Martin-Baker Aircraft Company Limited	92
Bendix Aviation Corporation	
Eclipse-Pioneer Division	59
Radio Communications Division	71
The B. G. Corporation	2nd Cover
Boeing Airplane Company	39
Braniff Airways, Inc.	51
Breeze Corps, Inc.	6
Buchanan & Company, Inc.	54
Burnham and Company	60
C	
Canadair, Ltd.	8
Capital Airlines, Inc.	3
Central Airlines, Inc.	109
Champion Spark Plug Company	12
Chicago and Southern Air Lines, Inc.	120
Collins Radio Company	79
Colonial Airlines, Inc.	117
Connecticut General Life Insurance Company	119
Consolidated Industries, Inc.	111
Consolidated Vultee Aircraft Corporation	Front Cover
Continental Air Lines, Inc.	61
D	
Delta Air Lines, Inc.	43
Dinkler Hotels	112
Douglas Aircraft Company, Incorporated	29
E	
Eastern Air Lines, Inc.	122
Emerson Electric Mfg. Co.	109
Esso Export Corporation	96
F	
Fairchild Engine & Airplane Corporation	32
Flightex Fabrics, Inc.	115
Frontier Airlines, Inc.	38
G	
General Electric Co.	34
General Laboratory Associates, Inc.	30
The Glidden Company	87
Goodall Fabrics, Inc.	88
B. F. Goodrich Company	14
Greer Hydraulics, Inc.	86
Gulf Oil Corporation	104

H

Halpin Coairdinator Company 115
Hamilton Standard Division, United Aircraft Corp. .....3rd Cover
Hawaiian Airlines Limited 45
Hertz Driv-Ur-Self System, Inc. 5
Hotel Lexington 112
Hydro-Aire, Inc. 22

L

Lake Central Airlines 44
Lear, Inc. 37
Lockheed Aircraft Corporation 107

M

The Glenn L. Martin Company 25
Mid-Continent Airlines, Inc. 38
Minneapolis Honeywell 69
Monsanto Chemical Company 62

N

National Airlines, Inc. 120
Northwest Airlines 10

P

Pacific Airmotive Corporation 18
Pan American-Grace Airways, Inc. 31
Pan American World Airways, Inc. ..46, 47
Paper Manufacturers Company 48
Philippine Air Lines, Inc. 99
Piedmont Airlines 115
Pioneer Air Lines, Inc. 112

R

Riddle Aviation Company 121
Robinson Airlines Corp. 108
Robinson Aviation, Inc. 60
A. V. Roe Canada Ltd. 83

S

Scandinavian Airlines System, Inc. 121
Simmonds Aerocessories, Inc. 7
Southern Airways, Inc. 109
Southwest Airways Company 111
Spartan Aero Repair 76
Sperry Gyroscope Company 85
Standard Oil Company of Indiana 9
Surface Combustion Corp. 63

T

The Texas Company .....Back Cover
Thompson Aircraft Tire Corp. 11
Transport Equipment Company 81
Trans-Texas Airways 108
Trans World Airlines 53

U

A. E. Ulmann & Associates Ltd. 41
United Air Lines, Inc. 21

W

Western Air Lines, Inc. 95
Wilcox Electric Company 65
Wisconsin Central Airlines, Inc. 101

ONE COUNTRY or ALL EUROPE

by SAS Vikingship!

Austria	Belgium
Czechoslovakia	Denmark
Finland	France
Germany	Great Britain
Greece	Holland
Italy	Norway
Poland	Portugal
Spain	Sweden
Switzerland	Turkey

and many more in Asia & Africa

Overnight-trip to one European nation or "Grand Tour" of the Continent—the choice is **SAS!** The "Route of the Vikings" covers all Europe from Portugal to Finland . . . from Turkey to the Arctic Circle. Passengers leave New York any day . . . cruise by luxurious **DC-6** . . . reach Europe in 12½ hours. Matchless **SAS** service and courtesy are present all the way.

SCANDINAVIAN AIRLINES SYSTEM

FLY SAS

Offices Throughout the U. S. A.

Riddle AIR CARGO

Daily **OVERNIGHT DEPARTURES**

★ **NEW YORK** to Miami and Puerto Rico with convenient connections to all South America.

★ **MIAMI** to New York and Puerto Rico. Special delivery service to northeastern states.

★ **PUERTO RICO** to Miami and New York with connections to all parts of the United States.

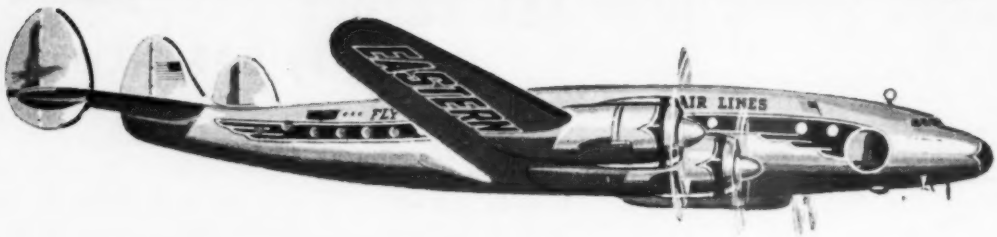
Riddle AVIATION CO.

NEW YORK, N. Y. -- 412 9th Ave.
Ph. Longacre 3-5406

International Airport, MIAMI, FLA. Ph. 88-6721

SAN JUAN, P. R. Ph. 3-0683
PONCE, P. R. Ph. 2080
ARECIBO, P. R. Ph. 363
MAYAGUEZ, P. R. Ph. 697

Biggest month in Eastern's history!

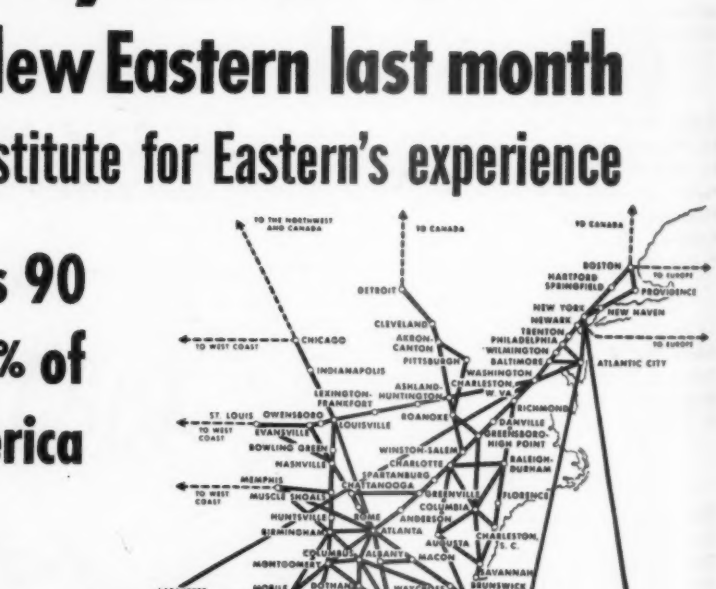


316,236

passengers flew Eastern last month

... there's no substitute for Eastern's experience

- **Eastern serves 90 key cities—90% of industrial America**



EASTERN'S EXPERIENCE GIVES YOU

DOUBLE DEPENDABILITY

★ DEPENDABLE AIRLINERS
★ DEPENDABLE PERSONNEL

"TRIED and PROVEN" over billions of passenger miles!

THERE'S NO SUBSTITUTE FOR EASTERN'S EXPERIENCE

EASTERN Air Lines

23 YEARS OF DEPENDABLE AIR TRANSPORTATION

(Continued from opposite page 3)

mission chairman was part of conspiracy to put non-skeds out of business. **Sen. Tobey** (R., N. H.) labeled this charge as an "innuendo" and "unwise." Heacock claimed CAB violated Civil Aeronautics Act in proposing $14,869,000 retroactive mail pay for Northwest Airlines, and cited decisions in which he said CAB favored skeds at public expense over non-skeds. Rentzel emphasized in testimony that under the new set-up CAB will remain independent and that he as Undersecretary could not cancel a certificate, change a route or force a consolidation.

AIRLINES

Atlantic Coach?: A Pan American World Airways' proposal for daily trans-Atlantic tourist service with 55-passenger DC-4's is expected to be one of the most controversial items on the agenda of the meeting of IATA traffic conferences, opening May 8 in Bermuda. Proposed in response to CAB's recent suggestion for immediate study of Atlantic coach possibilities, PAA's plan was opposed by TWA in talks with CAB preliminary to the IATA meeting. PAA would charge $225 one-way and $405 round-trip New York-London and would use Constellations if DC-4's were not acceptable. TWA said it would be forced to institute similar service with result that U. S. lines would be operating 14 round-trip coach flights weekly. Foreign lines could also be expected to enter the field, it added.

WAL Buys DC-6B's, Refinances: Purchase of five Douglas DC-6B's at a cost of over $5,000,000 and complete refinancing with private banking sources of the balance of company's RFC loan were revealed at Western Air Lines' stockholders meeting. WAL also declared a 25c dividend, the first since 1936. Company's RFC loan had been reduced from $6,500,000 to $2,500,000 and this balance plus funds for new plane purchase will be financed by a western banking group headed by the Bank of America.

EAL Bids High: Eastern Air Lines bid $355,000 for a Douglas C-54 owned by the CAA. The figure was $125,000 over the next highest bidder. Transocean Airlines was high bidder at $151,000 for another CAA C-54. EAL's need for the plane is related to recall by the Navy of 13 passenger-type C-54B's which have been leased to the airline. EAL returns four of the planes in May and three in June, July and August. CAA originally obtained the two C-54's at no cost from Air Force. AF recently inspected the planes and estimated that their maximum value to AF was $100,000 in spare parts, the planes not being worth required modification.

NWA to Sell Martins: Northwest Airlines may sell 10 of its 20 Martin 2-0-2's and may possibly dispose of the entire fleet if a suitable market is found. The Babb Co. and Air Carrier Supply Corp., aircraft brokers, are offering the planes for sale at about $350,000 each, and both foreign and domestic prospects are reported to be interested.

MATS Returns 6 Planes: Six DC-4's from Korean airlift have been returned to airlines by Military Air Transport Service, leaving total of 60 participating. Three were returned to Northwest Airlines and one each to Pan American, United and American. Release was made possible by increasing utilization of remaining planes and does not indicate a reduction in charter lift.

TWA Sells 5 Stratoliners: TWA has sold five four-engined Boeing 307 Stratoliners to Aigle-Azur Co., privately-owned French airline operating between France and its colonial possessions. Total price was $550,000. Economic Cooperations Administration funds were used.

Dissents on Discount: The scheduled airlines' 10% discount to the military for official travel in fiscal 1952 has been approved by CAB but dissents by two members indicate that the discount may run into trouble in future years. Chairman Rentzel and Members Ryan and Adams said they approved it because existence of a national emergency "results in special circumstances which justify arrangements for discounts to military agencies." Members Lee and Gurney dissented, however, stating that the discount "under present conditions" is "economically unsound, unjustly discriminatory and inconsistent with the objectives of the Act." They branded the discount as a "hidden contribution from mail pay appropriations to the Department of Defense."

UAL Elects Johnson: **Robert E. Johnson,** director of public relations and advertising for United Air Lines, has been elected a vice president and assistant to the president of the company.

People: **George E. Bounds** has been named director of public relations for Chicago and Southern Air Lines, succeeding **Larry Keil,** resigned. Bounds was pubrel director for C&S from 1936 to 1946, when he went with McDonnell Aircraft Corp. The latter terminated its publicity department last year.

1950 Airline Salaries

Following are 1950 airline salaries as reported to CAB:

American Airlines

C. R. Smith, pres. and dir., $50,000 directors fees and total salary; **O. M. Mosier,** v.p. and dir., $30,000 (up $2,500); **R. E. S. Deichler,** v.p., $30,000 (up $2,500); **L. G. Fritz,** v.p., $30,000 (up $2,500); **William J. Hogan,** v.p. and treas., $30,000 (up $2,500); **William Littlewood,** v.p., $30,000, (up $2,500); **C. W. Jacob,** v.p. and secy., $27,500 (up $5,000); **Rex W. D. Smith, Jr.,** v.p., $22,500 (up $1,250); **Amos Culbert,** v.p. (resigned January 15, 1950), $10,833.33 (down $9,166.67); **G. J. Brandewelde,** v.p., $22,500; **G. K. Griffin,** v.p., $15,395.63; **J. G. Flynn,** asst. v.p. (see American Overseas Airlines listing), $4,222.25; **Marvin Whitlock,** asst. v.p., $14,273.05; **Glenn E. Markt,** asst. v.p., $10,300 (up $870.36); **W. H. Miller,** asst. v.p., $18,000; **Carlene Roberts,** asst. v.p., $25,000 (up $10,750); **C. R. Speers, Jr.,** asst. v.p., $18,000 (up $1,500); **P. G. Larie,** comptroller and asst. treas. $16,000; **V. J. Long,** asst. treas. and asst. secy., $13,500; **W. L. McMillen,** asst. treas. and asst. secy., $13,500 (up $400); **T. O. English,** asst. treas., $10,200; **L. E. Glasgow,** asst. compt. and asst. treas., $13,050 (up $2,471.49); **A. A. Paradis,** asst. secy., $8,250 (up $750); **A. R. Bone, Jr.,** regional v.p., $12,375 (up $505.71); **W. N. Bump,** regional v.p., $12,375 (up $875); **Walter Johnson,** regional v.p., $12,375 (up $1,375); **Stanley G. King,** regional v.p., $12,375 (up $375); **M. D. Miller,** regional v.p., $13,500 (up $750).

Trans World Airlines

Ralph S. Damon, pres. and dir., $84,166.63 salary (up $21,666.63), $500 directors fee, $17,799.47 bonus and indirect compensation (including amounts for retirement plan); **Warren Lee Pierson,** chm. of bd., $64,791.59 (up $6,041.61), $400 directors fee, $16,710.16 bonus and indir.; **E. O. Cocke,** v.p. sales and dir., $27,291.59 (up $4,791.59), $500 directors fee, $8,174.00 bonus and indir.; **J. A. Collins,** v.p. oper. and dir., $44,583.23 (up $9,583.23) $400 directors fee, $12,770.59 bonus and indir.; **A. V. Leslie,** v.p., treas. and dir. (Resigned as treasurer October 31, 1950 and as v.p. November 30, 1950.), $26,766.67 (up $366.67), $400 directors fees, $4,996.60 bonus and indir.; **C. E. Fleming,** v.p., $18,958.38 salary (up $1,583.38), $6,886.31 bonus and indir.; **George H. Clay,** secy., $17,395.78 (up $4,476.16), $4,205.11 bonus and indir.; **Erle M. Constable,** treas. (Elected treasurer effective October 31, 1950), $13,874.92, $1,924.82 bonus and indir.; **Matthew J. Plodinec,** comptroller $14,870.83, ($2,077.24 bonus and indir.

Eastern Air Lines

E. V. Rickenbacker, pres. and dir., $50,000 salary (up $15,000), $8,087.87 directors fees and retirement plan; **Paul H. Brattain,** first v.p. and dir., $29,583.32 (up $2,583.32), $4,574.90 fees and retirement; **S. L. Shannon,** 2nd v.p. and dir.,

$27,083.24 (up $2,083.24), $3,364.25 fees and retirement; **T. F. Armstrong,** secy., treas. and dir., $19,583.24 (up $2,083.24), $2,591.07 fees and retirement; **J. W. Moore,** asst. secy., asst. treas. and dir., $14,500 (up $2,500), $1,832.07 fees and retirement; **L. P. Arnold,** v.p., $21,666.64 (up $4,166.64), $2,650.47 fees and retirement; **M. M. Frost,** v.p., $24,583.20 (up $2,083.20), $2,487.45 fees and retirement; **S. de J. Osborne,** v.p., (resigned 3/15/50), $4,687.50 (down $17,812.50), no fees and retirement.

CIVIL AERONAUTICS BOARD

Actions

• **Chicago and Southern Air Lines'** application to add Chicago as co-terminal on U. S.-Caracas route turned down because: (1) volume of traffic would not support or warrant non-stops from Chicago to Caribbean area; (2) diversion from other C&S schedules and from carriers serving Latin America through Miami would be high; and (3) C&S' mail pay requirements would be increased. Authority was sought by the line to permit Chicago-Havana non-stops. Present certificate requires stops at New Orleans.

• **United Air Lines'** certificate for Route 1 amended to permit service to Boston/Hartford and New York/Newark on same all-cargo flights. Award, valid through August, 1954, contains restriction, however, against carriage of local traffic between the points. Prior to decision, United operated the service under a temporary exemption.

• **Economy Airways** turned down on application for individual exemption to continue operations as a large irregular carrier. The New York non-sked, according to CAB, operated unauthorized route-type services between New York on one hand, and Houston, San Juan, and Miami. Economy was given 30 days to appeal.

• **Braniff Airways'** application for exemption to serve Santa Cruz, Bolivia, as an intermediate between La Paz and Asuncion, turned down. CAB said proposal, protested by Pan American-Grace Airways, raises issues which require public hearings.

• **Rader Flying Service,** small irregular air carrier, certified by CAB for loan involving 70% deferred participation by the Reconstruction Finance Corporation. Loan is by First National Bank, Glenwood Springs, Colo., for $20,000. RFC participation is for $14,000.

Applications and Petitions

• **KLM Royal Dutch Airlines** amended a pending application for revision of trans-Atlantic permit to request extension of permit for not less than three years. Expiration date on present permit is Sept. 17, 1951. In original application, KLM asked to serve Boston and New York as intermediates and Curacao, N. W. I. as new terminal on trans-Atlantic route.

• **California Central Airlines** applied for certificate to conduct helicopter mail and property operations in San Francisco area. Line now operates passenger and property intra-state service in California with conventional aircraft.

• **Cuba Aeropostal, S. A.,** applied for foreign permit for mail and property services between Havana and Miami. Without backing of Cuban Government, line was recently denied passenger, property, and mail permit by CAB. Cuba now supports carrier's bid for a cargo-mail service on the Havana-Miami route.

• **Air Transport Associates,** large irregular carrier, protested proposed new mail rates for Northwest Airlines and asked leave to intervene in the proceeding before CAB.

• **Western Air Lines** asked CAB to reconsider decision which authorized Frontier Airlines, by exemption, to originate and terminate flights short of terminals on Routes 73 and 74. Route 73 was old Monarch Air Lines' route and 74 was Challenger Airlines'. Western asked that Board "at least" prevent Frontier from exercising the authority between Pueblo and Denver, Denver and Cheyenne, and Pueblo and Cheyenne via Denver.

• **Chicago and Southern Air Lines** advised CAB of its opposition to National Airlines' proposed daylight DC-6 coach operation between New York and Miami. Approval of the service, airline said, would probably force it and other carriers into similar coach operations for purely competitive reasons.

• **Western Air Lines** excepted to Examiner Ferdinand D. Moran's recommendation that Los Angeles Airways be authorized to transport passengers in helicopter operations to points presently served by permanently certificated fixed-wing operators.

Examiners Reports

• **Miami Airlines** should be denied individual exemption to continue large irregular carrier operations, Examiner Walter W. Bryan recommended. Application was denied tentatively by CAB last September, but when Miami appealed Board granted public hearings. Bryan conducted the hearings and said, on the basis of the record, Miami has not established grounds sufficient to warrant an exemption.

CIVIL AVIATION

Identification Cards: CAA has started issuance of identification cards for all pilots, mechanics and other airmen. Deadline for obtaining cards is Sept. 1, 1951. Airmen must furnish two photos, proof of identification and citizenship. CAA Aviation Safety district offices and safety agents will issue cards.

LABOR

MRA Praised: Moral Re-Armament has been credited with settling disagreements and grievances of three years standing between National Airlines and its pilots, and with averting a strike that had been scheduled for Jan. 15. **G. T. Baker,** NAL president, and **W. T. Babbitt,** Miami regional vice president of Air Line Pilots Association, said 33 grievances and 13 other points had been settled. Babbitt stated that "if the management and the pilots of National continue to work as a team, as they have been doing this past 90 days, this will be one of the most successful airlines in the country and known in the piloting profession as one of the best with which to be associated."

Lockheed-IAM Agreement: Agreement covering wages and working conditions at Marietta, Ga., plant has been negotiated by Lockheed Aircraft Corp. and International Association of Machinists. Contract, which runs until Aug. 22, 1952 but which can be reopened next October by either party on wages, is similar to one in effect at Burbank, Calif., and has same wage maximums and minimums.

FINANCIAL

Manufacturing

Texas Engineering and Manufacturing Co. reported $500,708 net profit for 1950 on sales of $12,793,866 compared with $945,175 on $12,893,582 sales in 1949. Present backlog is about $61,000,000.

Luscombe Airplane Corp. subsidiary of Texas Engineering and Manufacturing Co., had $112,139 on sales of $207,424 for nine months ended Dec. 31, 1950. Company's backlog is $3,500,000.

The Sperry Corp. had 1950 earnings of $9,588,718 on $162,454,591 sales, against 1949 profit of $5,328,555 on $114,048,818.

Irving Air Chute Co. reported 1950 net loss of $35,171 against $2,701 profit in 1949. Sales rose from $1,043,520 in 1949 to $1,805,977 last year.

Bendix Aviation Corp. reported $2,578,457 net profit for quarter ended Dec. 31, 1950, against $3,798,919 profit in same 1949 period. Sales in 1950 quarter were $67,044,705 against $52,379,209 in 1949.

Airlines

Chicago and Southern Air Lines reported 1950 net profit of $856,035 against $630,087 net in 1949. Operating revenues reached a new high of $12,885,044, while expenses totaled $11,890,982.

Braniff Airways' net profit for first quarter of 1951 is estimated at $417,000 compared with loss of $230,000 in same 1950 period. Net profit for first two months was about $317,000, with March profit placed at $100,000.

Northwest Airlines reported net loss of $135,478 for 1950 on revenues of $51,396,000 and expenses of $51,595,000. Sundry income items and income deductions plus tax loss carry over credit of $265,000 brought 1950 loss to $493,961, against which was applied $385,483 mail pay credit for previous years leaving $135,478 net loss. In first two months of 1951, NWA lost $1,152,000 against $2,539,678 loss in same 1950 period.

Colonial Airlines had 1950 net loss of $310,520 against 1949 loss of $318,715.

148 out of the 148 Lockheed *Constellations* now in service or on order for U. S. airlines depend on Hamilton Standard *Hydromatic* propellers. In fact, *Hydromatics* now are specified for 98% of all U. S. transports.

HAMILTON STANDARD

Wherever Man Flies

UNITED AIR LINES, 1926-1951: From single-engined Swallow biplanes to the double-decked Mainliner Stratocruisers now in over-water service to Hawaii, United Air Lines has spanned a quarter-century of air transport growth. To date, United has flown close to 9¼ *billion* revenue passenger miles and more than 145 million cargo ton miles. Its great Mainliner fleet—*engines of which are lubricated with Texaco Aircraft Engine Oil exclusively*—serves 83 cities and 22 states, as well as the District of Columbia, British Columbia and Hawaii.

TEXACO TOASTS UNITED AIR LINES' 25TH BIRTHDAY

A cake with 25 candles, and a record of growth outstanding in transportation history, mark United Air Lines' birthday this year.

In the quarter-century between 1926 and 1951, United—the first transcontinental commercial air line—has expanded its system from 460 to 13,250 route miles, upped its personnel from 10 to 10,000, and increased its fleet from six single-engined, open cockpit planes to 135 giant Mainliners.

Texaco is proud to have played a part in this growth . . . proud that the engines of every United Mainliner are lubricated exclusively with *Texaco Aircraft Engine Oil*. In fact—

For more than 15 years, more revenue airline miles in the U. S. have been flown with Texaco Aircraft Engine Oil than with any other brand.

Dependable performance and operating economies—both are assured with Texaco Aviation Products and Texaco Lubrication Engineering Service. To get them, just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, *Aviation Division,* 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants and Fuels

FOR THE AVIATION INDUSTRY

TUNE IN . . . TEXACO STAR THEATER starring **MILTON BERLE** on television every Tuesday night. See newspaper for time and station.

American Aviation

NEWS ISSUE

Entered as Second Class Matter

April 23, 1951

Vol. 14 No. 40

THE ARMY LIBRARY
ROOM 1-A-522
THE PENTAGON
WASHINGTON 25
D C

7-8

ORDER 138
7A51 5A1-A

RECEIVED
23 APR
ARMY LIBRARY
SERIAL RECORD

a LOOK at the WEEK

Army now has over $90 million to spend for planes in fiscal 1951, more than double previously-reported figure.

•

Defense Production Administration's big backlog of applications for five-year tax write-off on new defense facilities has caused slowdown in processing them. Manufacturers formerly could get okay in matter of days, but it's now running into weeks. DPA has 6,000 applications totaling $11 billion; it has issued 700 for about $4.6 billion.

•

Manufacturers are making big strides in substitution of new metals for critical metals formerly used in jet engines. Pratt & Whitney J-48, for example, is now constructed entirely of metals available in either North or South America.

•

Authority for government to construct defense plants is favored by some government officials.

•

It's unlikely that legislation will pass Congress on government assistance for design, construction and testing of prototype passenger and cargo planes. Present law covers only testing. Bills were introduced and chances originally looked good, but Senators say there's no push behind them.

•

Despite cancellation of family plan by Colonial Airlines and Trans-Canada, other lines are expected to renew when June 30 expiration date rolls around. There's been considerable sentiment toward abandoning the plan.

•

Defense Production Administration will be asked by Air Coordinating Committee to okay priorities for foreign purchasers of U. S. personal planes and spares.

•

Report of Air Coordinating Committee on future potentialities of helicopter as passenger and mail carrier will be finished soon. All field survey work is completed.

•

Civil aviation mobilization task groups didn't make Apr. 15 deadline for final report. Training and manpower groups couldn't complete work in time. No definite deadline extension has been set.

•

Almost all large airports are experiencing unprecedented flight activity, mostly from operations of air carrier and corporation or executive planes.

Mobilization Slowing Down

Mobilization production program is definitely slowing down, despite opposition of the Joint Chiefs of Staff.

Here are the developments behind the slowdown:

Appropriations: Most recent [illegible] supplemental defense appropriation request called for only $1.1 billion for plane procurement—less than one-third of what manufacturers originally expected it to be.

Monthly Orders: Last few months have fallen below those of last two months of 1950, whereas they should have increased.

Advertised Bids: Air Force is reverting to advertised bid procedures after having virtually abandoned them 60 days ago in favor of faster negotiated bids.

Slowdown is due to two major reasons:

Spreading Production: Office of Defense Mobilization favors spreading production out over a longer period in order to maintain a more balanced national economy.

Less Tax Load: Korean war pace has slowed to point where Administration feels it can eliminate, or at least postpone, tax hikes that a big mobilization push now would require.

Joint Chiefs still feel build-up to authorized goals by end of fiscal 1952 is mandatory, on the basis that Korean war has no effect on outlook in Europe, still considered tense. However, as matters now stand, here's the outlook:

Aviation Goals: Air Force and Navy goals remain unchanged, but goal-attainment dates may be moved back by 18 months to two years.

Peak Production: Big year will be fiscal 1953 instead of 1952 as originally planned, unless a new international development brings a return to original schedules.

It all adds up, observers say, to the fact that even in the national emergency, the Administration is still playing with the up-again down-again production policy which proved so costly during pre-Korea years.

CMP Starts July 1

Controlled Materials Plan, under which steel, copper and aluminum will be allocated directly to producers of defense items, goes into operation July 1.

There'll be two phases to plan's development:

First: Producers must report to National Production Authority their detailed requirements for the three basic metals. Forms will be sent to them in May.

Second: Allotment to producers, starting July 1, of the specific amounts of materials, after determination by Defense Production Administration of the necessary production programs.

Although the aircraft industry still awaits answers to many questions on the plan, it is known that CMP will fall into two categories:

"A" Products: Those where most convenient method of production authorization is vertical. Producers of "A" products get their authorizations and allotments from their customer, which, in the case of a prime contractor, is a government agency. A sub-contractor's customer is a prime contractor or another sub-contractor.

"B" Products: This list includes products where it is most practicable to furnish authorizations horizontally, directly to producers. In general, this list [illegible] leased [illegible] include certain [illegible] type products [illegible] industrial [illegible] and equipment, and needed components. [illegible] products on this list will be authorized and allotments from NPA Industry Division.

REFERENCE COPY

Final list of products for which application forms will be required has not yet been compiled. Tentative list, however, includes aircraft and parts, instruments, radio and radar equipment, machine tools, metal working machinery and accessories, repair and replacement parts.

NPA says that CMP leaves to industry the major share of responsibility for getting out the necessary production. Producer of planes, for example, must allot controlled materials to his sub-contractors and schedule production so that all parts and components are ready on time and in right quantities. Exception is certain components which are in such great demand that NPA will devise special programs to try to assure availability.

CMP is to be decentralized after first quarter of operations. Most producers will then deal through NPA field offices.

Lightplane Production Pinched

Materials pinch can be expected to hit most personal aircraft manufacturers soon unless priorities situation is straightened out. Pinch is already being felt by some companies: one manufacturer produced 120 planes in December, fell to 50 in January, 50 in February.

Lightplane makers are only getting spot priorities assistance—there's no definite policy covering them. Policy has been kicking around since late 1950, but there's no final action.

DPA Lags: Trouble spot is Defense Production Administration. Not that DPA's necessarily against the priorities—it's a question of getting things handled. The policy matter has been shuffled between a number of DPA officials. Result: no policy.

Plane makers will settle for priorities to make 2,500 aircraft this year. If the lid was off materials, they claim they'd have a market for close to 6,000.

Background: Air Coordinating Committee in February approved a temporary policy recommending that lightplanes be produced for 90-day period on annual production rate of 2,500 (compared with 3,386 in 1950). Purpose of this period would be to enable government to watch priorities requests to determine if planes for non-essential users could be weeded out.

National Production Authority said it couldn't okay ACC's policy, that it was DPA's responsibility. Two months have passed since ACC's approval of the policy and nothing's been done.

Hope is that DPA will act soon. In the meantime, however, materials shortage is beginning to be felt; manufacturers are uneasy.

CAB to Investigate Colonial Airlines

CAB will investigate Colonial Airlines, Sigmund Janas, Sr., president, and Alfred M. Hudson, vice president, for possible violations of the Civil Aeronautics Act, economic regulations and uniform system of accounts.

Detailed charges won't be disclosed until hearings open Apr. 30 in U. S. Court House, Foley Square, New York, before a Board examiner. Disclosure might have possible "unnecessary adverse effect" on the parties, CAB said.

Portions of the statute alleged to have been violated indicate, however, that investigation will concern rebating practices, stock ownership disclosures, interlocking relationships and accounting methods and practices. CAB would not comment on possible criminal penalties if charges are proved, but its investigation order cited various criminal penalty sections of the Act.

Panagra-NAL Interchange Approved

Tentative approval has been given by CAB to plan of National Airlines and Pan American-Grace Airways for interchange service between New York and Buenos Aires. Interested parties have 30 days from Apr. 13 to file exceptions.

Under the agreement, which will be effective until CAB decision in newly-instituted New York-Balboa Through Service Case, through New York-Balboa service will be available on Panagra DC-6's, one round-trip daily. Interchange, which has resulted in hot words between Pan Am and Grace interests in Panagra, involves use of PAA trackage Canal Zone-Miami. Continued use of this trackage by Panagra was insured by CAB extension of PAA-Panagra Through Flight Agreement.

CAB recognized that on long-term basis interchange would imperil Braniff's revenues from connecting traffic at Havana. However, it pointed to temporary nature of interchange and to its recent proposal to certificate Braniff to Miami or Eastern to Havana to make future interchanges possible. Case will be speeded.

MANUFACTURERS

New Convair General Manager: **A. P. Fontaine** was elected vice president and general manager of Consolidated Vultee Aircraft Corp. He replaces **LaMotte T. Cohu** as general manager; the latter continues as president. Fontaine, who was with Convair from 1939 to 1945, has been director of University of Michigan's Aeronautical Research Center.

CG Orders 2 Martin 4-0-4's: First military sale of the Martin 4-0-4 twin-engined transport has been made by The Glenn L. Martin Co. to U. S. Coast Guard, which bought two of the planes. Specifications are similar to commercial version.

Columbium Order: To assure more effective distribution of scarce columbium and columbium-tantalum-bearing steels to aircraft engine producers, National Production Authority announced (amendment to Order M-3) that defense rated orders of the alloy metals must be approved by Aircraft Production Resources Agency.

People: **Alan G. Binnie** has been elected vice president of Kollsman Instrument Corp., and **Lowell H. Freye** and **Arthur Richenthal** named treasurer and secretary.

PLANES & EQUIPMENT

Auto-Planes for Army: Army Field Forces board is testing Taylor Aerocar and Fulton Airphibian at Ft. Bragg, N. C. to determine possible Army use.

AF Tests Goodyear Gear: Goodyear's cross-wind landing gear is being evaluated by Air Force in basic pilot training at Perrin AFB, Sherman, Tex. Seven North American T-6G trainers are equipped with gear, and regular cadets are flying the planes. AF says it doesn't know yet whether gear will become standard equipment or whether it will speed pilot training.

Delta Modifies DC-6's: Delta Air Lines will spend $500,000 modifying its DC-6's by installation of Pratt & Whitney R-2800-CB16 engines and high activity propellers. Modification will permit 20% increase in payload for same takeoff distance or 20% decrease in runway length, and increase cruising speed to 335 mph.

American Aviation

News Issue (ABC) **Vol. 14 No. 40**

WAYNE W. PARRISH, Editor and Publisher
ERIC BRAMLEY, Executive Editor

American Aviation is published every Monday by American Aviation Publications, Inc., Washington, D. C. Printed at the Telegraph Press, Harrisburg, Pa. Subscription rates for United States, Canada, Mexico, Central and South American countries—$5.00 for 1 year; $8.00 for 2 years; $10.00 for 3 years. All other countries—$7.00 for 1 year; $12.00 for 2 years. Entered as Second-Class matter in Washington, D. C., and Harrisburg, Pa.

Editorial and business offices: 1025 Vermont Avenue, N. W., Washington 5, D. C. Telephone—STerling 5400.

American Aviation incorporates Airports and Air Carriers, Airports, Aviation Equipment, The American Pilot, Aviation Sales and Service, U. S. Aviation, and American Airports. All rights to these names are reserved.

Piper Agricultural Plane: Piper Aircraft Corp. will sell its agricultural plane, essentially a Super Cub with 125-hp Lycoming engine and flaps, for $4,975 with combination unit for either spray or dust. If a plane is furnished, Piper will install dust unit for $905, spray unit for $1,012, or combination for $1,280.

McCulloch Tests MC-4: McCulloch Motors' MC-4 helicopter is undergoing 100-hr. ground tests in Los Angeles.

Stronger Seats: Strengthening of aircraft seats to withstand an acceleration nine times the acceleration of gravity has been recommended by airworthiness division of International Civil Aviation Organization. Present standards call for six. Division also recommended that member nations try to reduce, by suitable design, injury and death arising from accelerations imposed by accidents and suggested that experiment and study be continued on three possible methods: (1) reversing the seats, (2) using forward-facing seats, with enough space between seats or suitable design to avoid injury by contact of occupant with seat ahead, (3) using suitably designed shoulder harnesses.

CAA Type Certificates

DC-6B: Certificated at gross take-off weight of 100,000 lbs., landing weight of 85,000 lbs. First deliveries by Douglas are two to United and two to American.

CB17: Pratt & Whitney R-2800-CB17 engine received certificate with carburetor setting specially developed to take either 100/130 or 108/135 gasoline. This means CB16 and CB17 will be same except for nameplate.

Taylorcraft: Four-place Model 15A, made by Taylorcraft Inc., powered by Franklin 150-hp engine. Plane has flaps and grosses 2,200 lbs.

Twin Bonanza: Although certificate has not actually been issued, CAA type certification board has okayed Beech Aircraft Corp.'s twin-engined Bonanza.

MILITARY

Constitutions to Stay: Navy has decided to keep its two 180-passenger Lockheed XR60-1 Constitutions in service. Fate of the planes, which have been flying between west coast and Hawaii, had been in doubt until request was approved for funds for spare parts, engine overhaul and heavy maintenance.

Greenville Renamed: Greenville Air Force Base, S. C., has been renamed Donaldson AFB in honor of a World War I ace.

CONGRESS

Nominations Confirmed: Nominations of **Delos W. Rentzel** to be Undersecretary of Commerce for Transportation; **Donald W. Nyrop** to be Civil Aeronautics Board chairman, and **Charles F. Horne** to be Civil Aeronautics Administrator have been confirmed by Senate Interstate and Foreign Commerce Committee.

Foreign Subsidy Study: Aviation Advisory Services, New York, has been hired by Senate Interstate and Foreign Commerce Committee to study subsidies paid to foreign airlines serving U. S. Committee thinks study will help it draft legislation for separation of subsidy from mail pay of U. S. international lines. **Selig Altschul**, aviation consultant, will conduct study, assisted by Dr. **Oliver Lissitzyn**, associate professor of law at Columbia University. Study is to be finished by July 15 at maximum cost of $6,500.

Bills Passed: Following action has been taken on bills affecting aviation:

H. R. 3587, third supplemental appropriation bill for 1951, passed by House. Contains $25,000 for CAB for development of a mail pay-subsidy separation program.

S. 435, amending Civil Aeronautics Act to permit Secretary of Commerce and CAB to issue war risk insurance on planes and personnel operating into war zones, passed by Senate. Companion bill pending in House.

CIVIL AERONAUTICS BOARD

Applications and Petitions

• **Petroleum Bell-Helicopter Service,** Lafayette, La., applied for certificate for non-scheduled helicopter operations within 75 mile radius of Houston. Company owns seven Bell Model D-1 helicopters, conducts contract operations out of Lafayette, and last month applied for certificate to serve the New Orleans area. Authorization is requested for carriage of passengers, property and mail.

• **Chicago and Southern Air Lines** asked CAB to investigate possibilities of transferring Greenwood, Miss., from C&S' Route 8 to Southern Airways' local service Route 98. Point is "unprofitable" for trunk line operations, C&S said, but suitable for local service operations because of its short-haul traffic characteristics.

• **Caribbean International Airways** applied for permanent or temporary renewal of its foreign air carrier permit. A Bahamas corporation, Caribbean was authorized in June, 1949, to operate non-scheduled services for two years between Tampa, Fla., and the Cayman Islands.

• **West Coast Airlines** amended pending route application to include proposed service over following segments: (1) Seattle-Walla Walla via Ellensburg, Yakima, and Richland-Hanford-Kennewick-Pasco, Wash.; and (2) Portland-Spokane via The Dalles, Ore., Yakima, Wenatchee, and Ephrata-Moses Lake, Wash.

Actions

• **Continental Air Lines'** Route 29 certificate amended to include Great Bend, Kans., as an intermediate between Dodge City and Hutchinson, for three years.

• **Eugene Joiner,** Kotzebue, Alaska, ordered to cease and desist from engaging in air transportation. Joiner was charged with conducting common carrier activities without appropriate authority. Order is effective May 6.

• **Northwest Airlines'** new mail rates made effective by CAB —two days after hearing. They include $1.5 million in back pay and provide for amortization of Martin 2-0-2 grounding costs.

• **Pan American World Airways'** authority to suspend trans-Atlantic service at Washington, D. C., extended until July 5, 1952, expiration date of current trans-Atlantic certificates. Previous suspension expired Apr. 8. A North Atlantic route co-terminal, Washington has not been served by PAA since March, 1948.

• **Regina Cargo Airlines'** non-scheduled operating certificate revoked for violations of the Civil Air Regulations. Charges included overloading of plane that crashed in May, 1950. Regina's certificate has been under suspension since the crash.

AIRLINES

Fare Cut Feared: There's feeling in airline industry that CAB decisions in two pending cases might lead to general fare reduction. One is application of four non-skeds for operation of 4c per mile transcontinental coach service; other is National Airlines' application for New York-Miami DC-6 daylight coach. Observers believe CAB showed some sympathy toward non-sked claim that airlines haven't met coach demands. Other airlines have said that NAL daylight coach would cause chain reaction extending across great portion of U. S. NAL, however, denies that proposal would result in industry-wide fare adjustment.

CAL Drops Mid-West Deal: Plan of Continental Air Lines to buy routes and assets of Mid-West Airlines for $70,000 has been dropped, following CAB's refusal to consolidate merger application with Mid-West certificate renewal case. Merger plans were conditioned on such consolidation. Indirectly, CAB's refusal amounted to disapproval of the merger. Board favors mergers, but integration of a trunk and local service line, particularly where latter's future is in doubt, is another matter. Mid-West's certificate expires June 24, 1951, but company will continue until decision in renewal case.

$26 Million UAL Financing: United Air Lines has arranged $16 million standby credit at 3% interest rate with group of 34 banks headed by National City

Bank of New York. Company has also sold $10 million 15-year 3½% debentures, of which $7½ million were taken by Metropolitan Life Insurance Co. and $2½ million by Mutual Life of New York. Principal use of funds will be purchase of new aircraft.

DO's for Airlines: Revised defense rated order program for certificated and irregular carriers has been set up by CAA's Office of Aviation Defense Requirements to coincide generally with those of military agencies. Priorities for commercial planes and parts will be handled under DO-01, electronics and communications equipment under DO-07, production equipment under DO-19 and miscellaneous under DO-21.

Slick Moves: Transfer of Slick Airways' general offices from San Antonio, Tex., to Burbank, Calif. is underway. Only engine overhaul is to remain in San Antonio.

SWA-WCA Merger Favored: Recommendation that CAB approve proposed merger of Southwest Airways and West Coast Airlines has been made by CAB Examiner **E. T. Stodola.** SWA would be surviving company. Examiner added, however, that CAB should give "serious consideration" to Western Air Lines' offer to operate the routes at less cost to government, calling it a "reasonable alternative" available to Board. He also suggested that airline industry and labor organizations negotiate a "national agreement" giving airline employes specific protection against adversities resulting from mergers.

TWA DC-4 Returned: TWA has received back one DC-4 from the Korean airlift. It will be replaced by a California Eastern Airways DC-4, giving that company four planes in the lift.

O'Reilly Leaves Arinc: **G. A. O'Reilly** has resigned as president of Aeronautical Radio Inc., airline-owned organization, and **J. S. Anderson** is acting president. **R. J. Gleason,** operations director, was elected vice president.

Colonial's Safety Record: Colonial Airlines on Apr. 18 completed its 21st year of scheduled operation without fatality or serious injury to passenger or crew member.

POA Control Changes: Control of Pacific Overseas Airlines has changed hands, and **Frank E. Hurd,** New York financial man, is now chairman of the board and president. Hurd group earlier this year offered stockholders $1.30 per share for $1 stock contingent on acceptance by holders of 51% of the stock.

1950 Airline Salaries

Following are 1950 airline salaries as reported to CAB:

United Air Lines

W. A. Patterson, pres. and dir., $72,028.46 salary (up $9,528.46), $6,597.77 retirement and insurance plans; **Otis E. Kline,** exec. v.p. and dir., $6,750 salary, $384.83 retirement and insurance; **J. A. Herlihy,** v.p. oper. and dir., $42,561.38 (up $5,061.38), $3,222.60 retirement and insurance; **D. F. Magarrell,** v.p. passenger service, $23,773.07 (up $3,273.07), $1,608.84 retirement and insurance; **Harold Crary,** v.p. sales, $20,061.32 (down $938.68), $3,136.26 retirement and insurance; **Hal E. Nourse,** v.p. economic controls, $19,530.64 (up $530.66), $1,630.24 retirement and insurance; **R. F. Ahrens,** v.p. personnel, $19,522.97 (up $522.97), $1,493.40 retirement and insurance; **R. W. Ireland,** v.p. traffic administration, $22,500 (down $2,500), $2,750.36 retirement and insurance; **Curtis Barkes,** v.p. finance and property, $17,140.28 (up $1,473.64), $1,137.13 retirement and insurance; **S. P. Martin,** secy. and asst. to pres., $12,390.47 (up $390.47), $835.85 retirement and insurance; **Carroll Blanchar,** comptroller, $12,650 (up $950), $626.70 retirement and insurance; **A. M. de Voursney,** treas. and asst. secy., $3,333.36 salary, $153.84 retirement and insurance; **N. B. Haley,** treas. (resigned 8/31/50), $11,525.66 (down $1,474.34), $1,696.30 retirement and insurance.

Capital Airlines

J. H. Carmichael, pres. and dir., $40,000 salary (up $5,000); **R. G. Lochiel,** v.p. treas. and dir., $26,000 (up $2,500); **J. W. Austin, Jr.,** v.p. $24,000 (up $6,000); **J. B. Franklin,** v.p. $22,500 (up $4,500); **R. J. Wilson,** v.p. $19,800 (up $2,040); **Hayes Dever,** secy., $15,500 (up $1,500); **C. H. Murchison,** chm. exec. comm. and dir., no salary (down $15,000).

Braniff Airways

T. E. Braniff, pres., $30,000 salary (up $1,500), $3,369.30 bonus and indirect compensation; **C. E. Beard,** exec. v.p., $24,250 (up $1,249.93), $1,983.87 bonus and indir.; **R. C. Shrader,** v.p., $17,625.08 (up $750.04), $1,888.43 bonus and indir.; **C. G. Adams,** secy. and treas., $17,625.08 (up $750.04), $1,624.39 bonus and indir.; **John B. Walker,** v.p., $23,041.78 (up $11,375.02), no bonus; **O. W. Crane,** asst. treas., $8,475 (up $75), $628.36 bonus and indir.; **R. L. Barrier,** asst. secy., $7,250 (up $50), $432.72 bonus and indir.; **Hal C. Thurman,** dir., $15,000, $999.17 bonus and indir.

Delta Air Lines

C. E. Woolman, pres., gen. mgr. and dir., $24,500 salary (up $500); **C. E. Faulk,** chm. of bd. and dir., $12,000; **Charles H. Dolson,** v.p. oper., $16,333 (up $333); **Laigh C. Parker,** v.p. traffic and dir., $18,250 (up $250); **L. B. Judd,** comptroller, asst. secy. and dir., $10,941.67 (up $141.67); **M. S. Biedenharn,** v.p. and dir. (deceased April 23, 1950), no salary; **Travis Oliver,** treas. and dir., $1,200; **C. H. McHenry,** secy. and dir., $1,200; **Catherine Fitzgerald,** asst. treas., $4,250 (up $100).

CIVIL AVIATION

Garner to Train for AF: Garner Aviation Co., Richmond, Va., has been invited by Air Force to enter into contract negotiations for operation of basic pilot training school at Bartow, Fla. First class of about 130 cadets is scheduled to begin May 29. This will be AF's fourth civil-operated school.

Sibley Retires: **Eugene Sibley,** chief of ICAO division of CAA's international region, has retired after more than 30 years of government service. Most of his CAA work was connected with design, construction and operation of airways.

FINANCIAL

Consolidated Vultee Aircraft Corp. had $2,495,886 profit before taxes on $61,012,990 sales in quarter ended Feb. 28.

Southwest Airways reported 1950 net earnings of $135,473 against $85,296 profit in 1949.

Beech Aircraft Corp. declared 20c quarterly dividend payable May 4 to stockholders of record Apr. 23.

COMING UP

Apr. 23-25—American Association of Airport Executives annual meeting, Minneapolis.

Apr. 24-26—Air Transport Association annual engineering and maintenance conference, Drake Hotel, Chicago.

Apr. 26-27—American Helicopter Society 7th annual forum. Washington, D. C.

International

Apr. 24—ICAO Communications Div. meeting, Montreal.
May 8—IATA Traffic Conferences 1, 2 and 3, Bermuda.

AROUND THE WORLD

Panair Orders Comets: Three de Havilland Comet jet transports have been ordered by Panair do Brasil for 1954 delivery. Panair is first foreign airline to order the plane.

BOAC Loses $13.5 Million: British Overseas Airways Corp. lost $13,550,000 in 12 months ended last Feb. 28, compared with $21,290,000 loss in previous 12 months.

Two More IATA Members: El Al Israel National Airlines and Jugoslovenski Aerotransport (JAT), of Yugoslavia, have become active members of International Air Transport Association, increasing membership to 65 lines from 45 countries.